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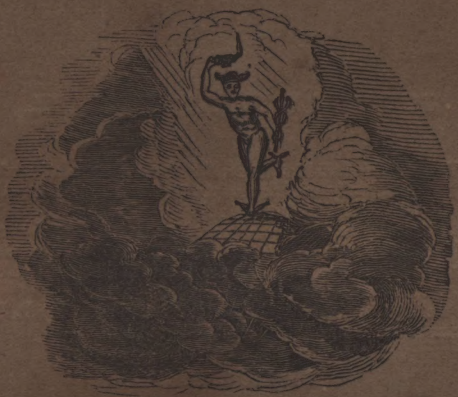

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THE ECLECTIC

JOURNAL OF MEDICINE.

VOL. IV. SEPTEMBER, 1840. No. 11.

OBSERVATIONS OF TENOTOMIA AND MYOTOMIA, FOR THE CURE OF DEFORMED MEMBERS; ANATOMICALLY, PHYSIOLOGICALLY AND THERAPEUTICALLY CONSIDERED. WITH SEVENTY-FOUR CASES.

BY ALBERT G. WALTER, M.D., OF PITTSBURGH, PA.

THE late discovery of tenotomia evidently proves, that the minds of men, in many instances, have been kept under the influence of opinions and doctrines which were not founded in truth; and that one of the greatest obstacles to the progress of science is that obstinate adherence of men to the ideas with which they are familiar, and to the principles with which they are acquainted. This alone, and not the want of ability of our professional forefathers—not their want of observation and reflection, prevented the introduction of this operation centuries ago.

The nineteenth century has exhibited impartial investigation and close observation, combined with judicious reflection, in every department of science; and for it, too, was reserved the overthrow of the orthopædia of the old school, and the establishing a new and successful practice, correct in its principle, which will stand as long as surgery is a science. With it the torturing contrivances of orthopædial machinery gave place to a simple and expeditious instrument—the knife; and the former only remains to posterity as a striking memento, that "*jurare in verba magistri*" ought not to be tolerated.

Several treatises on club-foot have lately appeared in Europe; among them Scoutetten's* deserves to be attentively perused by everybody who takes an interest in this operation.

In this country many surgeons have done justice to this new practice; among whom are Dr. Mütter, of Philadelphia, and Dr. Wm. Detmold, of New York; who have laid before the profession some valuable observations. But as the subject is new, and cultivated only by few members of the profession, I believe it a duty incumbent on every one who has had sufficient opportunities to test its practicability, to submit his observations to the profession, to enable it to obtain a thorough and perfect understanding of it.

Differing in some points in regard to the treatment of deformed limbs, and in view of the process of reparation of the divided tendons, and their consequent anatomico-pathological condition at the point of reunion, from the practice and opinion hitherto advocated, we intend to offer some observations, to which we will add a number of cases supporting, as we think, our views.

The principle being established, that deformities, in nearly every instance, depend on muscular contraction, in consequence of which the articulating surfaces of the bones become wholly or partially displaced, the ligamentous connections

* Which has been reprinted in the library of Professor Dunglison.

and the aponeuroses shortened, and that the division of these contracted parts will restore the limb to its natural shape and position—the question remains, whether in the different varieties of deformed feet and members, *some, or all*, the contracted muscles, tendons, ligaments and aponeuroses, ought to be divided?

Before entering into an examination of the relations of the constituent part of an inverted club-foot, (the pathological anatomy of which is admirably and satisfactorily given in Scoutetten's treatise, to which I refer the reader,) experience enables me to state, that in any case of club-foot, whether inverted, everted or phalangian, in which the section of the tendo-Achillis does not materially alter the shape and position of the foot, the section of other tendons, and also of the ligaments, ought to be performed at once, in order to save time and pain to the patient, and to accomplish a more perfect cure. We now regard the skilful section of the tendo-Achillis as trifling and unattended by any serious consequence; why, therefore, should we hesitate to cut other tendons participating in the contraction, by which the deformity can often be remedied instantly? The operation when performed on all contracted tendons and muscles at the same time does not inflict much more pain, nor is it attended by any serious consequence; and the great advantages are—shortening the cure, lessening the pains arising from the extension of the tendons and ligaments not cut.

To be convinced of the propriety of the practice, let us analyse a dissected inverted foot in an aggravated form, and we will see that the contraction of the tendo-Achillis is not sufficient to cause such a degree of deformity; nay, it is but trifling in itself. So convinced am I of this fact, that if the alternative were left to me either to divide the tendo-Achillis, or the other equally concerned, I should not hesitate to prefer the latter, and trust to the mechanical extension of the tendo-Achillis.

I arrived at this conclusion by carefully dissecting inverted club-feet. I divided first the *tendo-Achillis*, after I had laid back the skin, and tried to bring the foot to its natural position. But I failed in the attempt. The *tendo tibial. antic. et postic.* being strongly contracted, had raised up to the sole of the foot and turned it somewhat inwards, in consequence of which the superior articulation of the astragalus is thrown outwards, and the *malleolus internus* is brought nearer to the *calcaneus*, constituting what is called a subluxation of the joint. The external surface of the trochlea of the astragalus, by protruding anteriorly, is not in contact with the external malleolus. Would the simple contraction of the tendo-Achillis cause this state? Certainly not: the calx would only be raised, but the astragalus would not be turned on its lateral axis. The greater or less luxation of this bone affords more or less difficulty to remedy the deformity.

The division of both these tendons (tibial. antic. and postic.) allowed the replacing of the astragalus under the articulation of the tibia, and the sole of the foot could be brought down, while the *internal annular ligament*, being attached to the posterior part of the *malleolus internus* and to the *os calcis*, and being much thinner than the *anterior annular ligament*, is easily stretched; but still the foot inclined much inwards, and its back remained very convex.

The *flexor communis digitorum brevis* with the *aponeurosis plantaris*, offer great resistance to the extension of the sole of the foot, which will be easily effected when they are cut; and as a consequence, the prominence formed by the opening of the articulation between the *os calcis* and *os cuboides* on the outer side of the foot, will disappear: but the section of these tendons being made, the foot

will still incline, and complete eversion is impossible. The contracted tendons of the tibial. antic. and postic. muscles have raised the inner side of the foot and brought the *tuberculum oss. naviculari*s, which, in a well shaped foot is about an inch distant from the inner edge of the malleol. intern., in immediate contact with it by the shortening of the *anterior and internal annular ligaments of the tarsus.* The first of the ligaments being inserted in front of the malleol. intern. is expanded over the *os naviculare;* the latter, or ligament. deltoid., arising from the posterior margin of the malleol. intern., is attached into the inner tuberosity of the os calcis. By the shortening of the anterior annular ligament the os naviculare becomes displaced, and goes inwardly from the round head of the astragal., followed by the os cuboides, leaving a space between itself and the anterior parts of the os calcis. The section of this contracted ligament between the tuberculum oss. navicular. and malleol. intern. is indispensably necessary for the easy and perfect eversion of the foot. If its section be completely made, severing the os naviculare entirely from the malleol. intern., the head of the astragalus will be wholly covered by the cavity of the os naviculare and regain its natural position, and the sole of the foot itself will allow of greater extension, and the convexity of its back will disappear.

I call the attention of the profession in particular to this point, which neither Scoutetten, nor any other surgeon, as far as I know, has mentioned, though all are aware of the difficulty of completely everting club-feet. Can we suppose that this thick and shortened ligament would easily and perfectly yield to the extension of more than an inch without being cut?

The division of the *flexor communis digitorum longus*, of the *flexor pollicis pedis longus*, and of the portion of the *abductor pollicis* inserted into the *os calcis*, will also aid in rectifying the foot, if they should participate in the contraction.

If, then, a complete section of all these muscles, tendons, ligaments, and aponeuroses, will allow of an easy reduction of the member to its natural shape and position, and if all these parts can be divided with perfect safety by making only a few incisions in the skin, which I have proved by the success of my cases; and if no untoward circumstance follow the operation performed after this manner, I do not see any reason why we should hesitate to perform the operation as described; more especially as the extension is easier, the time much shortened. Every surgeon who has experienced the painful and tiresome process of everting the foot, and guarding the very tender skin of some patients against the constant pressure, and consequent sores which interfere with the continuance of the extension, must grant that a greater degree of pressure is necessary to evert and extend a foot while ligaments and tendons are undivided, than when their section is performed; and that after all his trouble the back of the foot will remain very prominent, which even the weight of the body during years' exercise cannot entirely overcome. But the foot will easily turn out and its convexity disappear during extension of the *anterior annular ligament*, and the *aponeurosis plantaris*, with other tendons, previously divided.

Though we are not partial to using the knife, when it is not absolutely necessary; nor to have recourse to an operation, if not indispensable, experience urges us to state that the section of all the muscles, tendons and ligaments implicated in the contraction is not only important to success, but will save much time and trouble both to patient and surgeon. We know very well that *other* tendons

beside the tendo-Achillis have been divided, either simultaneously or at intervals of some days, by several surgeons; but, generally speaking, too much stress has been hitherto laid on the section of the tendo-Achillis to the neglect of the other tendons, and *without any regard* to the contracted ligaments. I do not deny the practicability of effecting a cure in some cases of club-foot by the division of the tendo-Achillis alone, but positively reprobate this practice in cases of grown people offering the deformity in its aggravated form.

We wish, however, to be understood, that the various degrees of club-foot and its varieties do not present the same number and the same tendons affected, but that it is left to the surgeon to decide which tendons are contracted. Children and persons of delicate frame, weak muscular system, will generally present slight cases requiring the section of only few tendons, while persons advanced in years and of firm muscular fibre will be afflicted with the deformity in a very aggravated form, which will require the operation on a more extended scale.

To perform the operation on the different tendons "*en deux temps*," as is done by several surgeons, is unnecessary, as it has been found that there is but little reaction after the division of all the contracted tendons, provided it is done with a sharp knife and the least possible incision of the skin.

With regard to the *operation* itself—each of the tendons, muscles and ligaments above mentioned, can be divided with safety, and no risk from being embarrassed by bleeding will be incurred, if we select the proper place for their section. The arteries in inverted club-foot of grown persons are much lessened in their diameter, and can be easily avoided.

It has been my practice to divide the *tendo-Achillis* one inch, or a little higher, above the os calcis, by passing the knife flatways between the tibia and tendon from the inner side without penetrating the skin on the opposite side (no important part will be injured, the posterior tibial and the peroneal artery being out of reach), turning its edge towards the tendon and withdrawing it, its point gliding along the inner surface of the skin, which insures a complete section.

For the division of the *tendo tibial. antic.* and *postic.*, the *anterior annular ligament*, and, if necessary, of the *flexor communis digitorum longus*, I pass the knife parallel with the longitudinal axis of the foot through the skin in the bend of the foot formed by its inclination below the anterior margin of the malleolus internus, and taking hold of the foot with the left hand, and extending it, I divide the tendo-tibialis anticus just above its insertion, then pass the knife deeply between the malleolus internus and tuberculum ossis navicularis, severing the thick annular ligament by repeated sections, and proceed with its section till I feel the knife grating against the capitulum ossis astragali; being sure that a complete section is made. Then turning the knife through the same orifice of the skin to the posterior part of the foot, I divide, just below the margin of the malleolus internus, the *tendo-tibialis* and *postic.*, and if necessary, the *flexor communis digitorum longus*, both being covered by the *internal annular ligament*, which forms separate channels for each of them. I do not carry the knife under these tendons, which would be difficult, but cut from above downwards, severing the internal annular ligament along with the tendons.

To operate, however, in this region with perfect safety, I do not carry the incision *beyond a line drawn perpendicularly over the middle of the malleolus internus*, lest the *posterior tibial artery*, passing in a sheath of the internal annular ligament

(ligamenteum deltoidium) along the sulcus of the posterior part of the inner ankle, between the flexor communis digitorum longus and the nervus tibialis, be divided. If the operation is done with this precaution, the tibial artery is out of danger, and no bleeding will follow. But by doing so, cutting into the astragalo-malleolar articulation cannot be avoided, and some surgeons, impressed with the belief that this practice would risk the safety of the patient, will feel disposed to reprimand us. Indeed, before practising this operation, we regarded incisions of the joints as very dangerous; but the operation on club-foot has revealed to us with what impunity a lesion of joints will be borne, if done with a very sharp knife, and with the smallest incision of the skin. Indeed, I firmly believe, that every joint in its healthy state will bear the injury of an incision made with the above precautions, and that the dangerous consequences resulting from accidents inflicted with cutting instruments are to be attributed to its shape and dulness, the exposure of the joint by a large incision of the skin, the lesion of the bony and cartilaginous apparatus, the degree of violence with which the injury is inflicted, and to the bad after management, though there are many cases on record where, even under such circumstances, the joint has been almost perfectly recovered.

It will sometimes happen that, while severing the *tendo tibial. antic.*, the *vena saphena interna* running close to it will be divided; but this cannot be embarrassing, as compressing the wound will readily arrest the bleeding.

Should the *flexor pollicis longus* be much contracted, its section is to be performed just behind the articulation of the os metatarsi pollicis and first phalanx of the big toe. On this point, by passing the knife close to and under the tendon (after it is made tense by extending the toe), from the inner side, and cutting it from below upwards, the *internal metatarsal artery* running along the inner side of the tendon will not be interfered with. The *abductor pollicis* is to be divided at its posterior attachment by grasping it between the fingers, introducing the knife below its body at the point of union of its two heads, and by cutting from below upwards; the knife being kept close to the muscle in order to avoid the internal malleolar artery, which passes along and under the outer side of its belly

It is true that the ligamentous connexions of the tarsal bones on their surface have contracted in consequence of the convexity of the back of the foot, and the separation of their upper articulating surfaces. But these being thin, will readily yield when the tendons and ligaments are divided.

There is more difficulty in operating on the small feet of children; the arteries and tendons are closer and the skin is fatter, preventing an exact examination of the implicated tendons. But fortunately only a few tendons are contracted in infancy, the ligaments in general easily yield, and do not offer the same resistance as in grown persons. The operation is to be performed in the same manner and at the same points as described, but with a much smaller and shorter knife.

I have performed the operation as above detailed in more than fifty instances, and can positively say, that I have never met with any serious accident, either from bleeding, or subsequent inflammation; that I could go on extending the foot easily and rapidly without inflicting much pain on my patient, and that in the worst cases extension for four or five weeks was sufficient to restore the foot

perfectly, while in slighter cases the cure was completed in from five to ten days.

It has repeatedly happened that the tendo-Achillis was only partially divided during the operation, and that the section had to be performed afterwards. The audible crack following the cutting of tendons and their sudden retraction does not prove that the section is complete, unless the extremities of the cut tendon can be felt apart, and for this reason I permit the knife to glide along the inner surface of the skin whilst dividing the tendon.

Can the fibro-cellular sheath enveloping the tendo-Achillis be saved, whilst the tendon itself is divided? and is it important to the process of reunion to preserve it from injury? In denying both these questions, I believe I am opposed to the opinion of some surgeons. With respect to the former, Dr. Mütter says, that once after having divided the tendo-Achillis, he subsequently found its sheath resisting, and that he had to cut this also. It appears to me beyond all doubt, that the tendon cannot be completely divided without cutting its sheath, and that Dr. M. had left some fibres of the tendons itself undivided, and mistook them for the undivided sheath. The fibro-cellular tissue covering the tendons is loose and yielding, and would never offer so great a resistance; moreover, it is closely attached to the tendons.

With respect to the latter question; some surgeons have dwelt particularly on the importance of leaving the sheath undivided, and have explained, with much theoretical reasoning, the process of reunion favoured by the undivided sheath. They say, the tendon being cut, retracts; the space between the cut surfaces is filled with blood, afterwards with lymph, and in this way the organization of a new substance uniting the extremities of the tendon is carried on. We will offer our views, based on post mortem examinations, on the importance of saving the fibro-cellular sheath when speaking of the process of union of divided tendons.

Another form of club-foot, the very reverse of the former, is represented in the *everted club-foot*, or *pes valgus* of the old school. The reader will find its anatomical description satisfactorily given by Scoutetten. This deformity is caused by the contraction of the tendo-Achillis, favoured by a relaxation of the ligaments of the tibio-astragalian articulation of the inner side, in consequence of which the muscles whose function is to evert the foot (*musculi peronei*) become shortened, while the inversores and flexores (principally operating in inverted club-foot) are lengthened. The appearance of the foot is remarkable: the back is very flat, and the sole entirely level, without the natural hollow of the instep. The tuberculum ossis navicularis is very prominent, and far from the inner edge of the malleolus internus. The astragalo-navicular articulation is relaxed, facilitating the greater eversion of the foot, and the astragalo-tibial articulation is uncommonly limber, so that the foot, if unsupported, constantly inclines outward. The superior articulation of the astragalus has slipped inwards, and the articulations of the tarsal bones in the sole of the foot are more or less opened in consequence of the flattened state of the back of the foot. The cuboido-calcanian articulation is much narrowed. The person walks on the inner side of the foot, the outer being drawn upwards. The malleolus internus is very prominent, whilst in inverted club-foot it is generally wanting.

To remedy this deformity, the tendo-Achillis and both peronæi muscles must be divided. The division of the former alone will not perfectly restore the foot

if the deformity is of long standing. The peroneus longus is inserted into the inferior face of the first cuneiform and os metatarsi ——; the peroneus secundus and brevis covered by the peroneus longus into the os metatarsi quintum. Both these muscles can be divided with safety, although covered by ligamentous fibres just below the malleolus externus, by cutting from above downwards. Scoutetten prefers their section above the malleolus externus near the edge of the fibula; but I believe they can be more easily divided below the malleolus, where they become tense, when the foot is forced into its natural position.

The operation for this deformity is more simple and easy than for the first described, and the after treatment gives less pain and trouble; but owing to the relaxed state of the flexor tendons and the ligaments below the malleolus internus, especially in cases of long standing, the unnatural eversion of the foot will reappear as soon as the support is taken off, even after the foot is straight and has been kept in its natural position for a length of time. The cure of this deformity, therefore, is not so striking, and much more time is required to support the foot, even in children, than in inverted club-foot. The reason seems to be this. After the cure of inverted club-foot, the weight of the body and exercise tends to keep the foot in its natural position; whilst, after the cure of everted club-foot, on account of the great relaxation of the ligaments around the malleolus internus, the foot, if not properly supported, will sink on its inner side under the weight of the body. If we could use means to strengthen these ligaments and tendons, or promote their contracting, the cure would be more perfect. A frequent cause of this deformity is a sprain of the ankle-joint, or sub-paralysis of the foot.

Every case of inverted club-foot irrespective of age* will admit of being perfectly restored without the slightest risk of a relapse, but in everted club-foot of long standing the foot of the patient requires to be supported, lest the deformity reappear.

The *third species* of club-foot is the *phalangian club-foot*, or *pes equinus*. It consists, in its more simple form, in the contraction of the tendo-Achillis only, and can then be very easily remedied; but if the deformity runs on unchecked, the flexor digitorum communis brevis, with the aponeurosis plantaris and the flexor proprius pollicis pedis, will contract, in consequence of which the back of the foot is made very prominent and the sole very hollow. Frequently the astragalo-scaphoidian articulation gives way, and the head of the astragalus projects considerably. If walking is much practised, the inner side of the foot will be raised from the concomitant contraction of the tibialis antic. and posticus muscle, the astragalus will be slightly thrown outwards, and the tuberculum ossis navicularis come in closer contact with the malleolus internus, inclining the foot inwards. The patient generally walks on the tip of his big toe; occasionally the toes turn under, and the weight of the body rests on the back of the toes.

This deformity is mostly acquired, and in its earliest stage readily remedied by the division of the tendo-Achillis, flexor communis digitorum brevis and aponeurosis plantaris; but in its aggravated form a complete cure is more difficult; and, according to my experience, more tedious than in inverted club-foot. The articulations of the tarsus have given way too much, and their replacement is very difficult, on account of the very great convexity of the dorsum pedis. We shall generally succeed in making the foot straight and useful, but not en-

* Except in cases of ankylosis of the foot-joint, but we doubt if it ever exists in conjunction with this deformity.

tirely remove the convexity of the back. In very difficult cases the tibialis anticus, posticus, flexor pollicis pedis proprius, and the anterior annular ligament, should be divided.

The *fourth and last species* of club-foot, mentioned for the first time by Scoutetten, is the *Calcanian*. It is a very interesting variety, and much more rare than either of the former. It has not yet fallen under my observation, and therefore I will refer the reader again to Scoutetten's treatise. The tibialis anticus muscle, extensor proprius pollicis pedis, and extensor communis digitorum pedis, must be divided to restore it.

Surgeons in every age have taxed their power of invention to produce instruments adapted to the various surgical operations; and every new operation, although in itself simple, adds to their number. Tenotomia, although but of yesterday, has already been performed with differently-shaped knives, which have their several advocates; as if success depended not on the hand that guides them, but on the instrument itself. For its performance, any small-bladed, sharp-pointed knife will answer. However, I prefer a slightly concave, very narrow, sharp-pointed knife, for this reason,—that in cutting the tendons from below upwards, its point will easily glide along the inner surface of the skin when withdrawn, and insure a complete section. With a convex-shaped knife, this manœuvre cannot be so conveniently performed, and some fibres might remain undivided. In some cases I found it very serviceable to use a strong cutting knife, rounded at its point, for the division of the anterior annular ligament, in preference to a sharp-pointed one, whose point might break by severing this strong ligamentous connexion. It is entirely unnecessary to use two knives at a time; one for making an incision through the skin, and the other for cutting the tendon.

It cannot be denied that the success of the cure will depend on the operation being skilfully performed; but it is also true, that the after treatment is of paramount importance. If this be not judicious, the effect of the operation will, in a great measure, if not altogether, be lost. A proper apparatus for the rectification of the foot, and a perfect knowledge of the condition of the displaced bones, is all that is required. Strohmeyer's apparatus is, indeed, the best for fulfilling all the indications, and though similar ones are used by Scoutetten and others, yet we prefer the former.* As we have made some additions to its machinery, which we have found very advantageous, we intend to describe them when speaking of the practice we follow in the rectification of the foot.

The *main object* in the after treatment of inverted club-foot should be to change it into the *phalangian* form; or, properly, to evert the foot before the attempt is made to bring down the heel. For this purpose we place the leg in the leg-board, and fix it in this position by several straps crossing in front of the leg and passing through holes in the board. We then evert the foot as much as possible without causing much pain, and adjust the sole to the foot-board, so that the inner edge of it is raised higher than the outer, which the machinery connecting the two boards will easily allow. The foot is best attached to its board by a kind of halter passing round the ankle, and by several straps crossing its back. After the foot is thus placed in the frame, the heel will appear much raised, giving the appearance of the phalangian club-foot. Every day I then

* The description of which has been already given, some time ago, in the American Journal of Medical Sciences.

draw down the inner side of the foot, and evert it till the big toe is in a line with the inner edge of the patella. But to do this properly and more conveniently, I have attached a pad with a screw to the inner corner of the leg-board, which rests against the inner condyle of the tibia, and prevents the knee from turning inwards while the foot is kept everted. To support the ankle-joint more firmly in the apparatus, and to facilitate its replacement, I have constructed a concave pad, pressing against the malleolus externus, which is gradually turned by the screw every day till the replacement of the astragalus is finished. There ought to be also a pad resting on the prominence formed by the anterior part of the os calcis and cuboides, in order to close the opening of this articulation whilst the foot is everted. After the foot is properly everted, and its inner side brought sufficiently down, and when the astragalus has been perfectly replaced under the articulation of the tibia, and the inner ankle has become somewhat prominent, I commence extending the tendo-Achillis ; and I am convinced, from the condition of the displaced bones, that this practice is preferable to the simultaneous everting the foot and depressing the heel. The depression of the heel should be continued until it appears lower than the toes, in order that the ankle-joint might be pliable, which is materially important in walking. The inner side of the foot, also, must be properly brought down and rather lower than the outer; for, if this be neglected, the patient will afterwards experience some straining under the external malleolus in walking. We have to continue the eversion of the foot until the prominence formed by the os calcis and cuboid has disappeared, and the os metatarsi digiti minimi is on a line with the outer edge of the calcaneus.

It will depend on the feeling of the patient, how much and how often we can extend the foot, and there will be found a great difference in this respect, owing to the individual sensibility. We generally could extend the foot once during the day ; sometimes oftener. Five days is the shortest time in which we succeeded in restoring the foot perfectly; and in grown persons, and very deformed cases, we have been able to remove the extending apparatus in four or five weeks with perfect safety.

To protect the skin against the pressure of the bandages is a point of great importance; for, in some patients, the skin will be found so tender and thin as to be unable to bear any tight bandaging for any length of time. These cases are exceedingly troublesome; and it requires the greatest care to prevent irritation of the skin, by frequent washing with a solution of acetate of lead, and frequent dressing. Where the skin is fatty and tough, we need not dress the foot sooner than once in five or six days. The best protection for the skin is air-cushions, for cotton is generally too heating.

Should the skin become sore, we must discontinue extension and apply cooling applications, and renew the extension only after the skin has recovered; for if pressure is continued the skin will slough, and very tedious sores will be the consequence.

In case of *phalangian club-foot* the process of extending is the same as in inverted club-foot; but in *everted club-foot* we have to depress the *outer side* of the foot, and to extend the peronæi muscles before the tendo-Achillis. Strohmeyer's apparatus answers for this deformity as well as for the others, but pressure must be made against the malleolus internus while the peronæi muscles are ex-

tended, in order to replace the tibio-astragalian articulation. It must be admitted as a rule, that in every case of deformed foot the heel must be depressed lower than the toes; for if this be neglected, the patient will not have the use of his ankle-joint.

After the foot has been perfectly restored, a shoe well supporting it is to be applied; and we take this opportunity to make the remark, that although the foot is straight, success will not be certain unless the strictest attention be paid to the proper application of the shoe. Persons in poor circumstances frequently neglect this indispensable requisition, and the consequence is, that the toes will incline, although the sole is flat, and the heel down. In addition to the abnormal mobility of the knee-joint, which is so frequent in this deformity, children will incline the toes, in order to relax the muscles situated on the back part of the leg; and it is of the utmost importance to prevent this by a proper shoe, which we direct to be worn for at least a year and a half: moreover, the *extensor and adductor muscles*, (tibial. antic. and postic. and gastrocnemii), constituting a larger mass of muscular fibres than the flexors and abductors, maintain in the embryo and infant the inward inclination of the toes and the elevation of the heel. Drs. Mütter, Detmold, and others, being aware of this troublesome inclination of the feet, have attempted to obviate it by uniting the soles of both shoes with jointed iron-pieces, of which the one fastened between the toes is longer than that between the heels. This, however, does not in general answer for a common shoe, even with straps inside of it; it does not confine the fore part of the foot so much as to prevent its inclination. The grand object should be to keep pressure against the articulation of the anterior part of the os calcis and os cuboides, and to keep the *ligamentum plantare* and the *inversores* of the foot constantly on the stretch. After much trouble we succeeded in contriving a shoe which has never yet failed with us; and if worn for a length of time, the feet will become as straight as if they never had been deformed.

A laced boot, with four strings inside, two at the heel, and two at its middle; and with a jointed iron plate inside of the sole, which is cut in a semicircle; and steel springs along both sides of the leg, and joined behind by crossing bars, we apply immediately after the extension is finished. The foot is tightly kept in this shoe by lacing it; and then we turn the sole of the shoe outwards, and keep it in this position by a strap fastened to the outer edge of the sole and attached by a buckle to the heel. Several straps secure the leg between the steel springs. We can confidently say, that this contrivance of a shoe has answered with us in every instance; and that it must do so, is evident from the principle on which it is acting. We direct the shoe to be worn for a year and a half, day and night; and the foot to be occasionally dressed; during this time, and even much sooner, the ankle-joint will have gained sufficient strength, and a common shoe or boot can then be worn without any risk of the toes turning in. It remains to offer a few remarks on the *gait and carriage of persons* after the cure of deformed feet. Our esteemed friend, Dr. W. J. Little, of London, in his treatise on the Nature of Club-foot,* written with a profound understanding of its anatomy and pathology,

* A treatise on the Nature of Club-foot and analogous Distortions, etc., by W. J. Little, M.D., London, 1839. We regret that we have not been able, as yet, to peruse this valuable work, as we received it just as our report was finished. It is one of the best monographs on this subject, and entitled to the earnest attention of the profession.

and investigating the subject physiologically, speaks on this matter so satisfactorily that we cannot do better than to quote some sentences, as they coincide with our own observation and experience.

If the deformity is removed in the first few years of life the gait and carriage of the patient are quite natural; but in patients more advanced in years, there will remain, mostly through habit, in the gait and carriage, a slight limping, which can only be overcome by time, and assiduous attention on the part of the patient. In *phalangian club-foot* the affected extremity appears longer; the pelvis is raised on the affected side, with a slight lateral curvature of the spine, owing to the unequal lengths of the extremities. The muscles of the trunk and legs, and even those connected with the upper extremities, acquire certain unsightly associated actions by the continuance of the deformity. In *inverted and everted club-foot*, the pelvis of the affected side is lower, on account of the shortness of the extremity, and the spine is slightly curved. But although the deformity be removed, and the extremities rendered of equal length, or very nearly so, and the pelvis becoming natural, and the spine straight—still a considerable time must elapse before the habit of gait and carriage is altered, and the muscles of the trunk entirely lose their accustomed actions. If there is no perceptible disproportion in the length of the extremities, and if the ankle-joint is perfectly limber and pliable, the acquired habit of walking is the only cause of limping. The patient should, therefore, pay the strictest attention to his walk, for, unless he does so, his gait will not be entirely natural. The surgeon cannot do more than to insist on this injunction; to give a better gait and carriage is out of the reach of surgical means.

Before discussing the question (a point on which there is much discrepancy amongst surgeons), whether extension of the foot should be commenced *immediately* after the operation, and the cut surfaces of the tendons be kept asunder, or whether *time* should be allowed for reunion to take place—the foot remaining in its abnormal position, I will offer some observations, derived from *post mortem* examinations, in regard to the process of reunion, and to the pathological condition of the tendon after the operation (a very important matter). Many experiments have lately been made by Bichat, Bouvier, Duval, Delpech, Von Ammon, Phillips, and a number of others, to ascertain the process nature follows in repairing the injury done by the section of tendons; and all these authors agree, that after division the tendon retracts in its undivided sheath(?), leaving between its extremities a space, greater or less, to be filled up in the same manner as in fractured bones, or in any other breach of texture, but without suppuration. Although the ends of the tendon, according to their observations, do not come in contact, they nevertheless speak of the reparation as a union by the first intention. But is that to be called union by first intention when an analogous structure to the extent of an inch or more is formed, although suppuration be wanting? Does not union by first intention imply the idea of juxtaposition of the divided extremities? Bouvier, who advocates the immediate extension, has minutely described the process of reorganization at different periods from the time of the operation; which we believe, however, is not correct. When Bouvier advanced his opinion, that it is not necessary that the divided ends of the tendons should be in contact, in order to unite, as had been believed by Michaëlis, Delpech, Strohmeyer, and others, the question naturally arose "how far might the extremities of the ten-

don be separated without incurring the risk of non-union?" We see, that in fractures, separation of the fractured extremities cannot be carried beyond a certain point without incurring the danger of an artificial joint. But with regard to tenotomia, many proofs have been brought forward by different authors, to show that even when separated two inches reunion will take place; while some, as Strohmeyer and Clement, of Avignon, in similar circumstances, once observed non-union. Important as this question is, which, if settled, would establish a fundamental principle in the treatment of deformities, yet the experiments hitherto made have not solved it, while a very weighty point in the vitality of muscular fibres has been entirely overlooked.

It is well known that muscular and tendinous fibres when cut will suddenly retract, in consequence of the inherent vitality and elasticity of their structure. But does the divided muscle or tendon continue in this state of contraction? We think not. An analogous proof is found in cutting arteries. If an artery is entirely severed, the extremities will retract and the bleeding will cease, owing to their coats longitudinally and transversely contracting and closing the opening; but after some time the bleeding will return. How can this happen, if the extremities of the artery continued in a state of permanent contraction? But it is a physiological fact, that all muscular structure endowed with sensibility and irritability will contract on the application of a certain stimulus, and that relaxation will necessarily take place as soon as the effect of stimulation has ceased. Considering the action of the knife as a strongly stimulating agent, promoting the vascular contraction, we see that relaxation follows as the natural consequence of the former. The explanation of this process rests on a physiological ground; but there is another, based on physical laws. We cannot deny inherent power of the muscular fibres to contract and relax when their equilibrium is disturbed; and must also allow that, independent of this, relaxation to a certain extent will ensue, the same as we observe after the cutting of a tense cord. The sheath of the tendon cannot form the receptacle of the blood extravasated between its extremities, in which the organization of a new tendinous structure, described by authors, takes place. For we have stated already that it cannot be saved while the tendon is cut, notwithstanding all our pains to obtain this desirable object. Bouvier's theoretical description, therefore, of the process of reunion of divided tendons, does not stand the test of scrutiny—for practical observation is opposed to it.

Nature, powerful in its operations, and ingenious in its intentions, is too often, we own, misunderstood by its ministers; nay, even sometimes opposed by our officious interference. So it is in regard to the treatment of club-foot. The surgeon divides the tendons to rectify the deformity; immediately forces the foot into its natural shape and position, and keeps the cut extremities apart, which he expects will be united by an intermediate tendinous structure of a considerable extent. If he would carry out his intention, the effect of the operation would certainly be frustrated, for reunion could not take place. But nature, ever anxious to repair injury in the shortest time and with the least expense, attempts to bring about union by first intention after the cut extremities have nearly met in consequence of the relaxation of the muscular fibres. Even the most imprudent surgeon could not separate the cut surfaces beyond the point at which coaptation can take place, if a continued stimulus is not kept up by tightly applied bandages,

which will prevent the relaxation of the muscular fibres, as might have happened with Strohmeyer in the case above mentioned. The ligamentous connection of the arch of the tarsal bones in club-foot prevents an immediate and entire restoration of the member to its natural shape and position; and as far as extension of the foot will be allowed, so far will the muscular fibres relax and the extremities of the tendon meet.

The process of union of divided tendons, which nature effects by the first intention, and not by the formation of an intermediate tissue, is like that of any other structure after coaptation is effected. The fibrinous portion of the exuded blood forms the uniting medium, which becomes organized, and scarcely a vestige of the new cicatrix is left at the place of union. This is confirmed by the observations of Bouvier and Von Ammon. The former states, that on patients examined at periods more or less remote from that of the section, the solidity of the uniting medium was such, that with great difficulty he could distinguish, by the touch, the place where the tendon had been divided.

The uniting medium itself, though very thin, is of a tendinous structure; showing at an early period tendinous fibres; and at seven months after the operation, we could not discover the place where the section was made but for the cellular tissue being more firmly united to the tendon at the point of the operation. A longitudinal section of the tendon itself did not show the least alteration of structure. This, we believe, is another proof of the correctness of our views, that union takes place by first intention. If carried on by an intermediate tissue of some extent, this certainly would afterwards be discernible by the touch or sight. But if the views of our opponents are correct, then are we indeed at a loss to explain why fractured bones, whose surfaces are separated to some extent, will sometimes withstand every attempt at bringing about union, even in the most healthy subjects, and under the best management. We should suppose that in fractures, as the bones are more abundantly supplied with blood-vessels, and covered with muscles offering great assistance to reparation, the process of reunion would be more speedy and certain than in tendons which are less vascular, isolated, and only covered by cellular tissue and skin. But experience has proved the reverse; the extremities of the tendon will unite nearly in every instance; while in fractures an artificial joint will frequently be the consequence. Moreover, we see that loss of muscular substance is very sparingly repaired, there being, generally, after cicatrization, an observable cleft between the cut surfaces; while in tendons united previously to their having been extended two inches or more, no trace of cicatrix can afterwards be discovered, nor even the slightest defect in its structure. I therefore firmly believe, that if the extremities of the cut tendon be kept constantly separated to the extent of two or three inches, reunion would not take place: the extremities would unite to the skin or periosteum of the adjacent bones, and there would then be left a deep and perceptible cicatrix. Are we not, therefore, justified in drawing this conclusion, when we observe deep cicatrices after the loss of muscular substance, in which the process of union will certainly be more vigorous than in the barren structure of tendons?

In conformity with the theory, that the reparation of divided tendons is carried on by an intermediate tissue of some considerable extent, our professional brethren have mistaken this supposed medium, which they describe as larger

than the tendon itself during the first few weeks after the operation for the swollen but coaptated extremities of the tendon itself. The intermediate tissue is, in reality, very small, only agglutinating the cut surfaces; but these are swollen as are the lips of every wound. This swelling at the point of union is soon removed by absorption, and then the tendon appears as if it had never been divided. But suppose the surfaces of the tendon to be kept apart; would the process of reorganization in a structure, less endowed with vascularity than any other, be carried on so vigorously in a few days as to form a uniting medium of such extent and thickness? We do not deny that reunion by granulations, filling up the space between the tendinous surfaces, can take place in some rare instances, if we prevent coaptation; but still the process would be very tedious, and there would be rather a defect of the substance of the tendon than an increase of it at the point of union. Scoutetten prefers the immediate extension of the foot, on the ground that the uniting medium would be broken, while it has to be elongated. His theory is entirely erroneous; for he considers the tendinous cicatrix as an inorganic substance, and not endowed with the least vitality.

But taking it for granted that an intermediate tissue, to the extent of an inch or more, fills up the space between the extremities, would there not be a risk of subsequent contraction of this newly-formed medium, as is the case with every cicatrix? This is the reason why operators heretofore have failed in their efforts to restore club-feet. The formation of an extended medium was the desideratum, but the cicatrix, which had formed after tedious suppuration, contracted, and thus their efforts were frustrated.

(To be concluded in the October Number.)

PARTIAL AMAUROSIS—INABILITY TO DISTINGUISH CERTAIN COLOURS.

BY ISAAC HAYS, M D.*

Case 1.—Mary Bishop, ætat. 20, unmarried, segar maker, admitted February 9, 1839. The early history of this case has already been given† by my colleague, Dr. Fox; it will be sufficient, therefore, to recapitulate here merely its prominent features. The patient stated, that she had suffered, previous to admission into the hospital, two attacks of cerebral disease, one in the spring of 1837, the other in the winter of 1837–8. After recovery from the first attack, objects for a time appeared to her double. The second attack left her entirely blind, in which condition she continued for four months. After this her sight began to return and at the period of her admission into the hospital she could read large print, as the heading of a newspaper. She was of a short, robust stature, full habit, very dark complexion, black hair and hazel irides, flushed face, colour of her cheeks at times almost of a purplish hue; catamenia suppressed. When she first came under my notice, which was in May, 1839, she had been largely depleted and had taken remedies for the restoration of the menstrual discharge, under which treatment her sight had improved.

Whilst examining her at this time to ascertain the degree of vision she possessed, her reply to one of our questions led us to suspect that she was unable to distinguish colours. When asked whether she could see the figure in her dress, which was a calico one with spots, she replied "Yes, I see the *brown*

* Report of Cases treated in the Wills Hospital for the Blind and Lame during the month of October, November, and December, 1839, with Observations. By Isaac Hays, M.D. one of the Surgeons.

† See American Journal of the Medical Sciences, for Nov. 1839, p. 16.

spots." Our attention thus directed to the subject, we soon ascertained that while she could distinguish forms, even of small size, with accuracy, her perception of colours was exceedingly imperfect. Repeated and careful investigations during this and on several subsequent occasions, satisfied us that the only colours which she knew with certainty were *yellow* and *blue*. Nearly all other colours she termed brown, or hesitated to name, designating, however, their shades or intensity of colour accurately. Thus a deep red she called a dark brown, a bright green a light brown, and a very pale pink a very light shade of brown.

We exhibited to her both by day and by candle-light, a number of colours, and have them now in our possession, with the names she bestowed on them. With the exception of yellow and blue all the other colours were named with much hesitation, and some only after our insisting on her doing so, and she then manifestly named them by guess. We abstain from giving the details because we are satisfied they lead to no further useful results than to prove that she could not distinguish other colours than the two just mentioned. On one occasion our friend A. D. Bache, Esq., President of the Girard College for Orphans, visited the patient with us, and with a view of comparing her defect of vision with that of Mr. Dalton of Manchester, exhibited to her a number of fabrics of various colours, which he had received from that distinguished chemist, with their names, as they appeared to him, attached. Nothing new or worth recording was elicited by this experiment, unless the following circumstance, which for a moment greatly perplexed us, be considered as such: and it is so perhaps in one point of view, as showing how careful it is necessary to be in similar investigations to avoid being deceived. After manifesting her inability to distinguish correctly any except two colours, she surprised us by naming accurately the colour of some red silk, and which she had previously misnamed. A bunch of red cotton, however, shown her immediately afterwards, she termed brown. On inquiring why she termed the first red, she said that she had "discovered some days before that red produced sparkles before her eyes." Suspecting from this that she had been somehow led to connect glossiness with red, I called her attention to some bright, glossy *green* silk, which she promptly called red. When these same articles were shown her in such a light that she could not perceive their gloss, she miscalled them as usual. How the patient came to connect glossiness with a colour we could not discover, but as her defect was at this time known through the house it is probable that some one had shown her a glossy red and given her its name.

The patient was not at all sensible, when we commenced the investigation of her case, that she laboured under any particular defect in distinguishing colours. She had noticed, she said, however, that grass and roses did not appear as they formerly did to her; the latter especially did not seem of their natural colour; but as her sight was imperfect she considered this as a natural consequence. She remembered, when questioned, that as her sight began to return, *the first colour she perceived was yellow*. This fact is of much interest, and she stated it with a degree of confidence, and mentioned some particulars which lead us to believe it to have been the case. She asserted most positively also that she had formerly been as well able to distinguish colours as any other person.

With a view to a revulsive action on the brain, and also to re-establish the catamenial flow, the patient was ordered pills of blue mass, rhubarb and aloes, every alternate night, in a dose to purge actively; mustard pediluvia at bed-time, and a blister to the sacrum. Two days before her regular period I ordered, in addition, mustard cataplasms to be applied nightly to the inside of her thighs, and the same diluted with an equal part of flour to her mammæ.

On the 29th May her catamenia appeared and flowed copiously, but continued only for a single day. It was followed, however, by very marked improvement in vision. She stated to me at my visit on the 31st of May, with much satisfaction, that the roses now appeared to her of their natural colour, and that she could distinguish the difference between the colour of the rose and the leaves of the bush, which she had not previously been able to do. Roses of different colours being presented to her she named them all correctly; she could also dis-

tinguish quite small letters distinctly, but not more than three at one time—her field of vision seemed limited.

On the first of June Dr. Fox took charge of the hospital, and from this period until the commencement of my regular term of service in October following I saw the patient only at considerable intervals. During this time her sight improved and with it her ability to distinguish colours. By the middle of June she was able, she said, to see the eye of a needle and the end of a thread, but could not thread a needle from inability to see both at the same time. At this period Mr. Bache again visited Mary with me and exhibited to her the prismatic spectrum. She distinguished pretty accurately the yellow, blue, green, and red. The orange she hesitated about and the violet she could not name. The colours were shown her together and separately: under the two circumstances she said they appeared somewhat different. Her retina on this, as on former occasions, seemed soon to become weakened by use. She would gaze at a colour for some time before naming it, and when looking from one colour to another, the impression of the first seemed to remain on the retina and for a time confuse her perception of the second. To avoid fatiguing the eye by too much exercise and to insure the accuracy of our observations, it was necessary on all occasions to conduct the experiments slowly and at intervals, and with great care and caution.

On the 1st of October, when the patient again came under my care, her vision was in the state just described, but her catameniæ were still suppressed, and she was subject to occasional attacks of fulness of the head, during which her sight somewhat diminished. She also suffered during the early part of this month from attacks of dyspnœa, which came on every morning before dawn and continued for an hour or two.

October 18*th*. For the last three days she has suffered much from fulness of the head, Face flushed; pulse active. Ordered v. s. ℥xvj. and to be purged with senna and salts. These remedies entirely relieved her head, and on the 22d of October she was free from all uneasiness, and could distinguish the different colours in a dress readily, and also small letters. She was now ordered mustard cataplasms to inside of her thighs, to sacrum and mammæ, and mustard pediluvium at bed-time, with a view to a restoration of her catamenia.

25*th*. Fulness of head; has had a return of dyspnœa; costive; sight not so good. Ordered cups to sacrum; to be purged briskly; mustard pediluvia. These relieved the head, but the period passed off without any catamenial flow.

30*th*. Feels quite well. Sight good; can read readily the small print of a newspaper. Distinguishes all the primitive colours readily, and names most of the secondary ones as correctly as could be expected from one of her moderate intelligence, with the exception of violet: this last she seems always at a loss to name.

She would now have been discharged but for her earnest request to be allowed to remain in the hospital one month more, that another effort might be made for the restoration of her catamenia. It would be uninteresting to detail the treatment to which she was subjected during this month, and which failed in producing the desired effect.

November 30*th*. Discharged this day, with her vision restored, and in good health; the catamenia, however, still suppressed.

Remarks. The feature of most interest in this case is the inability to distinguish colours. This is, we believe, the first example hitherto recorded of this inability having resulted from disease, or been co-existent only with it. As a natural defect, the power of distinguishing forms being perfect, it is not rare. Several instances of this have come under our own observation, and not a few others have been mentioned by writers. Such of these last as have been recorded with sufficient details to furnish data for comparison, viewed in connection with the case we have recorded, lead to conclusions which it may not be uninteresting to notice.

1. As a natural defect, inability to distinguish colours may exist in different degrees.

2. In the worst degree, the individual is able merely to distinguish shades,—the perception of colour is entirely absent. Examples of this are afforded in the two Harris's, who could distinguish a striped riband from a plain one, but could

not perceive the difference between any one colour and another, except as darker or lighter,* and in Dr. Elliottson's second case.†

3. In the next degree, the individual can distinguish only a single colour, and that colour is always yellow. Thus Dr. Butter states that Robert Tucker knew to a certainty *yellow* only,‡ and it appears that the boy whose case is recorded by Dr. Nicholl§ was in the same condition.‖ Now it may be called to mind that Mary Bishop states when her sight improved the first colour she recognised was yellow.

It may be mentioned here, as connected with this subject, that we noticed a similar phenomenon in the case of a lady whom we attended for amaurosis in the winter of 1837–8. This patient, who was quite blind, began to recover her sight, and among the early evidences of improvement she mentioned, was her ability to distinguish shades of colour, as the stripes in a Venetian carpet; she could not perceive, however, a single colour. When further improvement took place she stated that she could recognise the *yellow* colour of a large looking-glass frame. A relapse then took place, from which she has not since recovered.

4. We may consider as the next degree of this defect where the individual can recognise two colours only; and these seem to be always *yellow* and *blue*. This is the most common grade of this defect. Examples of it are afforded in Scott,¶ Dalton and his brother,** in the case recorded by Dr. Nicholl in the Med. Chirurg. Trans. ix, 359; in that of J. B. related in the Transactions of the Philosophical Society of Edinburgh, vol. x, p. 253; James Milne,†† Mr. C.,‡‡ Mr. Troughton,§§ and Dr. Elliottson's first case,‖‖ and Sir David Brewster's case.¶¶ Mr. Scott, J. B.*** and Mr. C. were imperfect in their recognition of blue; in the other cases the perception of yellow and blue seemed complete.

It is remarkable that, whilst all the individuals who belong to this class of cases are able to discern yellow and blue, they cannot distinguish these colours when represented in a state of mixture. Green they do not know—they seem blind to it. They cannot perceive any difference in colour between a stick of red sealing-wax and a green table-cover; between the colour of the scarlet fruit of the Siberian crab and the green of its leaves, &c., &c.

So it was also with Mary Bishop: whilst able to detect yellow and blue she could not see the difference in colour between the red roses and their green leaves. It was not until her eye had become sensible to red that she could distinguish green.

* Huddard, in Philosophical Transactions for 1777, p. 260 and 263.

† Am. Journ., vol. xxiii., p. 446. The narrator states that this patient was deficient in discerning two primitive colours. It is manifest from the account, however, that this defect extended to all, and that the gentleman could merely distinguish shades. The rainbow, it is said, appeared to him "as a band of a lighter colour than the other part of the sky, but a little darker at one side than the other, and gradually shaded off between the two sides."

‡ Transactions of the Phrenological Society, p. 209.

§ Medico-Chirurgical Transactions, vol. vii., p. 472.

‖ It would seem, indeed, that it was only the lighter yellows that this boy recognized accurately; he confounded the darker with red. This last colour he is said to name correctly, but the whole account proves that he could not distinguish this colour. Thus he called green, red; light red and pink, blue; paper stained with red raddish root he termed blue; green spectacles he called red glasses, &c.

¶ Philosophical Trans. for 1778, p. 612.

** Memoirs of the Literary and Philosophical Society of Manchester, vol. v., p. 28.

†† Transactions of the Phrenological Society, p. 222.

‡‡ Glasgow Medical Journal, vol. ii., p. 15. §§ Brewster's Optics, Am. ed., p. 260.

‖‖ Am. Journ. Med. Sci., vol. xxiii., p. 446. ¶¶ Optics, Am. ed. p. 260.

*** The editor of the American edition of Brewster's Optics, in a note, p. 323, says, in relation to this case, "The Plymouth tailor, whose case is described by Mr. Harvey, seems not to have been entirely blind to red light, and to have been in a measure blind to blue." He has been, we believe, misled in the former inference, by the account of Mr. Harvey, who was himself deceived by the individual naming scarlet correctly on one or more occasions, by *guess*. A careful examination of Mr. Harvey's statement, will, we conceive, justify this belief. This disposition to *guess* the names of colours is generally manifested by persons who have the defect under consideration; and the errors to which this may lead must be carefully guarded against.

5. It seems probable that individuals who are able to recognise *accurately* the three primitive colours, can also distinguish the secondary ones. To future observations must, however, be left the decision of this question. But persons whose perception of red is imperfect do not accurately discriminate the secondary colours.

As the imperfection in vision we have been noticing is a very curious one, it may be allowable here to call attention to some further facts connected with it.

It must be remarked, that whilst those who labour under this defect naturally are unable to distinguish certain colours, though of the most vivid kind, they can discriminate any marked difference in *shades* or degrees of colour, and can see minute objects often with perfect distinctness. It occurs in persons whose point of vision is natural, as was the fact in most of the cases on record, and also in those who are far sighted, as Mr. Nicholl's fourth case and Mr. Colqhoun's second case; and in those who are near sighted, as in Mr. Dalton.

This defect appears often to be hereditary, or at least to prevail in certain families. Thus Harris had two brothers who were unable to distinguish colours, while two other brothers and sisters, as well as his parents, had not this defect.* Scott's father and one sister had the defect; his mother and another sister were free from it; but his mother's brother had it. The former sister had two sons, both labouring under the defect. Scott had two children who were able to distinguish colours.† In Nicholl's first case the mother and father and his four sisters were free from this defect, but his mother's father had it. This last had two brothers and one sister; one brother had the defect, the others not.‡ In Dr. Nicholl's second case several of the family were similarly affected.§ Mr. Dalton had a brother who laboured under the defect,‖ and he mentions that he knows of a family of six sons and one daughter, in which four of the sons were unable to distinguish colours.¶ Tucker's maternal grandfather had this defect; Wardrop states that several branches of a noble family in Great Britian have been remarkable for having it;** and we know of a family in this country similarly circumstanced.

We have often noticed that persons affected with cataract, who were unable to discern the *form* of objects, in consequence of the irregular refraction of some of the rays of light and interception of others, could distinguish generally, very accurately, *colours*. Connecting this fact with the inability to perceive colours while forms could be discerned, as observed in Mary Bishop and some other cases of amaurosis, it occurred to us that we might derive from this a means of diagnosis between the two diseases. Subsequent investigations have not confirmed this idea. The subject may, however, be worthy of a more extensive examination than we have bestowed on it.

Several *theories* have been proposed to explain this defect of vision. Mr. Dalton thinks it probable that the red light is in these cases absorbed by the vitreous humour, which he supposes may have a blue colour; but this is a mere conjecture, which is not confirmed by the most minute examination of the eye, and does not even explain all the phenomena.

Dr. Young thinks it more simple to suppose absence or paralysis of those fibres of the retina which are calculated to perceive red; but there is no evidence of there existing in the retina fibres suited to the perception of the different colours, and this also does not embrace all the degrees of the defect.

Sir David Brewster, after analysing certain cases, says "In all the preceding cases there is one general fact that red light and colours in which it forms an ingredient, are not distinguishable by those who possess the peculiarity in question." Hence he at one time concluded that the eye is in these cases insensible to colours at the one end of the spectrum, just as the ear of certain persons has been proved by Dr. Wollaston, to be insensible to sounds at one extremity of the scale of musical notes, while it is perfectly sensible to all other sounds.

* Philosophical Transactions. 1777.
† Philosophical Transactions for 1778. ‡ Med. Chirurg. Trans., vol. vii., p. 472.
§ Med. Chirurg. Trans., vol. ix., p. 361.
‖ Mem. Lit. and Philos. Soc. Manchester, vol. v. ¶ Ibid.
** Essays on the Morbid Anatomy of the Human Eye, vol. ii., p. 199.

More recently he has offered the following explanation of the phenomena. "The eyes of such persons," he remarks, "are blind to *red* light; and when we abstract all the red rays from the spectrum constituted as already described,* there will be left two colours, *blue* and *yellow*, the only colours which are recognised by those who have this defect of vision. To such eyes, light is always seen in the red space; but this arises from the eye being sensible to the yellow and blue rays, which are mixed with the red light. Hence blue light will be seen in the place of the *violet*, and a greenish-*yellow* will appear in the orange and red spaces, or, which is the same thing, the spectrum will consist only of the *yellow* and *blue* spectra."

This theory embraces only one class of cases, and even in them it does not explain all the phenomena, as for instance, how it is that those who can perceive yellow and blue cannot distinguish those colours in a state of mixture; for of green they seem to have no perception.

Dr. W. Nicholl has proposed a theory† which is, however, so opposed to all the facts that it is unnecessary to occupy time in detailing it.

Mr. Wardrop thinks "it is not improbable that this defect of vision arises from a greater sensibility of the retina to the impressions of the blue and yellow—making rays, than to those of any of the others." "This may depend," he observes, "upon the refractive power of the humours, by which the rays of these two colours are more accurately united on the retina than rays of any other colour, and, consequently, the images formed there of objects reflecting these colours are more distinct than those formed of objects reflecting the other colours. When the colour of a body is compounded of several colours, the superior correctness of the image formed by the blue and yellow rays reflected from it, may cause the sensations which these colours excite to predominate over the sensations caused by the other colours, and thus may cause in the mind of the observer the perception of that compound colour to be different from the perception of the same colour to another person, whose eye forms images of external objects differently."‡

It is almost unnecessary to say that this is pure hypothesis, and is even contradicted by some careful investigations presently to be noticed.

Sir John W. F. Herschell attributes this state of vision to a defect in the sensorium, by which it is rendered incapable of appreciating exactly those differences between rays on which their colour depends. This profound philosopher observes, "We have examined with some attention a very eminent optician, whose eyes (or rather eye, having lost the sight of one by accident) have this peculiarity, and have satisfied ourselves, contrary to received opinions, that all the prismatic rays have the power of exciting and affecting them with the sensation of light, and producing distinct vision, so that the defect arises from no insensibility of the retina to rays of any particular refrangibility, nor to any colouring matter in the humours of the eye preventing certain rays from reaching the retina, (as has been ingeniously supposed,)but from a defect in the sensorium by which it is rendered incapable of appreciating exactly those differences between rays on which their colour depends."§

This is essentially the phrenological doctrine. According to the phrenologists the eye only receives impressions, the power of judging of them resides in the sensorium; and the inability to distinguish colours does not result from any defect or imperfection of the eye, but upon that particular portion of the brain which they have named the "*organ of colours.*"‖

We trust that the preceding remarks will induce others to investigate this curious defect in vision under consideration. Opportunities, we believe, for it are of more frequent occurrence than is supposed, and if the opportunity be taken advantage of and the observations made accurately and with a proper method, a clue will no doubt be obtained to its explanation.

* Optics, Am. ed., p. 69. † Annals of Philosophy, Feb. 1822, p. 128.

‡ Essays on the Morbid Anatomy of the Human Eye, vol. ii., p. 200.

§ Encyclopodia Metropolitans, art.. Light, p. 434, § 507.

‖ Mary Bishop's case would seem to favour this theory, her affection having been the sequel to an attack of cerebral disease.

The prismatic spectrum, as it is always the same, and thus enables us to compare observations, should be made use of. The colours should be shown together and separately, and the individual's powers tested carefully. It is particularly desirable now to ascertain first what primitive colours the individual can distinguish, and which, if any, of the compound colours.—*Amer. Jour. Med. Surg.*

THE ANATOMICAL VARIETIES OF CONGENITAL CLUB-FOOT.

BY M. JULES GUERIN.

The following analysis, which we obtain from the Lancet, comes in seasonably in confirmation of the practice detailed by Dr. Walter, of Pittsburgh, in the initial article of our Journal.—*Ed. Ecl. Journ.*

There are four anatomical varities of congenital club-foot, viz., *pes equinus*, *varus*, *valgus*, and *talus*.

The *pes equinus* is characterised by a permanent flexion of the foot on the leg. In the most simple form we find nothing more than a mere contraction of the muscles of the calf, by which the heel is drawn upwards. But the *pes equinus* is rarely simple; it is generally complex, that is to say, connected with certain other deviations. Thus, M. Guérin has pointed out, amongst the general characteristic of *pes equinus*, the shortening and widening of the sole of the foot, &c. In the first degree of complex pes equinus there is, at first, nothing more than a slight shortening of the muscles which join the tendo-Achillis. Here the deformity is evidently due to muscular contraction. It could not depend on any position of the fœtus *in utero*, because the foot still conserves its normal relation to the leg. As the deformity, however, becomes more developed, the sole of the foot is more excavated, different other muscles of the foot partake of the contraction, and the toes are sometimes drawn even underneath the heel.

An inspection of the muscles of the leg and foot, in the different degree of *pes equinus*, further confirm the views of M. Guérin. In the first degree the calf is small and short, placed somewhat higher than in the normal state. The edges of the gastrocnemii and soleus muscles are felt, tense and resisting, like so many chords, showing that the muscle is undergoing a change to a fibrous state. When the deformity is greater, the calf is still higher, harder, and flatter, though all trace of muscle has not disappeared. Are not these, asks M. Guérin, the evident effects of a permanent and primitive muscular retraction?

Varus.—The essential character of *varus* is a turning-in of the foot, in such a manner that the sole has a tendency to become vertical. It presents three varieties. Simple *varus* is extremely rare; in 400 cases of club-foot, M. Guérin has seen only seven examples. This form, also, is but a fixation of a normal movement of the foot, and depends on retraction of the muscles which effected this movement. The muscles are, in the first place, the tibialis anticus and posticus; and, in the second place, the gastrocnemii (*jumeaux*) and flexors of the toes. M. Guerin shows that the torsion of the foot inwards depends on the above-mentioned muscles, by considering the disposition and direction of the articular surfaces, the points of insertion of the muscles, and, finally, their mode of action. But *varus* is, as has been remarked, seldom simple; it is more frequently combined with permanent adduction and a curvature of the foot inwards. The first of these effects is produced by the tibialis posticus, aided by the flexors of the toes, which have become adductors in consequence of the deviation of the foot. The curvature of the foot depends on the gliding of the scaphoid bone over the head of the astragalus, and on the rotation of the latter bone, in a vertical direction; these latter elements of deformity being aided by retraction of the flexor and adductor muscles of the great toe.

In *equinus varus*, the second variety of *varus*, the heel is elevated, at the same time that the anterior part of the foot is more or less turned inwards. In the third variety of *varus* the torsion of the foot predominates over the elevation of the heel; M. Guerin enters into a rigorous analysis of the movements of the foot, and demonstrates that these varieties are all the consequence of retraction of the muscles of the leg and foot.

In *valgus* the foot is twisted on its inner edge, the plantar surface looking outwards. The agency which effects this is twofold, viz., retrraction of the peronei and extensor communis muscles, and paralysis of their antagonists, the tibiales, flexors, &c.

In *talus* the heel is depressed, and the anterior portion of the foot elevated, This deformity, also, is shown to be the effect of a permanent state of muscular retraction in an extreme degree; the muscles of the calf are relaxed, while all those which extend the foot are in the highest state of contraction.

The reader will easily divine the practical conclusions to be drawn from the above remarks. The cure of the different species of deformity (if the theory of their cause be correct) is simply effected by destroying the muscular retraction on which they are shown to depend. The observations of M. Guerin are particularly valuable in this point of view. He indicates with precision the particular muscles which are concerned in the production of each species and variety of club-foot, and thus enables the scientific practitioner to attack at once the more immediate cause of the deformity. Experience fully confirms the inductions drawn by the author. For the *pes equinus* he divides the tendo-Achillis, and sometimes the flexor proprius pollicis pedis; for simple *varus*, the tendons of the tibiales; for *equinus varus*, the tendo-Achillis, and the tendon of the tibialis posticus; for *varus equinus*, the tendo-Achillis, tibiales, extensor proprius, and adductor of the great toe, and sometimes the peroneus longus; for *valgus*, the tibialis anticus, peroneus brevis, and extensor communis; finally, in other cases of a complex description, the plantar fascia and other muscles.

CASES ILLUSTRATING THE EFFICACY OF DIVIDING THE INTERNAL RECTUS MUSCLE, FOR THE CURE OF SQUINTING.

BY P. BENNET LUCAS, ESQ.

CASE I.—April 7, 1840.—Catherine Culbert, aged 60, has had strabismus from the time she was three years old. The right eye is turned deeply towards the inner canthus, so that the outer segment of the circumference of the cornea looks forward. There are two specks of long-standing on the cornea.

When the left eye is covered the turned-in one slightly alters its direction, and by an effort the patient can direct it outwards in a sufficient degree to bring into view the entire of the cornea, and a very small portion of the conjunctiva, between it and the inner canthus. She cannot, however, retain the eye longer in this position than a few seconds.

Notwithstanding the very unfavourable condition of the eye of this patient for an operation, the difficulties which offered themselves in reaching the muscle at fault for the purpose of its division, and after its division the question which naturally presented itself, whether an eye for fifty-seven years thus deformed would resume the normal condition it had enjoyed but for three years, I proceeded to the operation, assisted by Dr. Hingeston and Mr. Wardrop, jun. A bandage was placed over the sound eye, so as to exclude the light. The upper eyelid was secured with a speculum, and the lower was depressed with the fingers. By these means the globe of the eye was also sufficiently fixed. Desiring the patient to direct her eye as much outwards as possible, I grasped the small portion of conjunctiva at the inner canthus, which was brought into view, with the square forceps, and divided this membrane from below upwards by means of a small knife, to the extent of about five lines. A partial chemosis almost immediately took place, from the effusion of blood and tears beneath the lips of the incision, which gave them a swollen appearance, and which more or less interfered with the future steps of the operation. I next inserted a double hook into the sclerotic coat, and found so much difficulty in everting the globe of the eye in a sufficient

degree to expose the insertion of the internal rectus muscle, that, at the suggestion of Dr. Hingeston, I bent a small, common probe (about four lines of the instrument) at an acute angle, and introducing it into the incision of the conjunctiva, I readily passed it underneath the muscle, and fitting it close between its insertion and the sclerotic coat, it was drawn with much ease towards the incision of the conjunctiva, and divided with a bent scissors. This manœuvre with the bent probe answered the purpose of bringing the muscle and globe of the eye so completely under my command that I determined, in the next case which presented itself, to adopt a similar proceeding.

The result of this case was unsatisfactory; it is now the 23d of April, and no decided improvement has been effected in the strabismus. It is a case, however, which is highly instructive, and fraught with the most satisfactory inferences in regard to the safety of the operation, and the new method of performing it. The woman was aged 60, and had the deformity fifty-seven years; under the most favourable circumstances she could but turn the eye slightly outwards, and it was therefore hardly to be expected that the operation would have been attended with the same happy effects which have followed the other cases in which I have operated.

This case proves the safety with which the operation can be performed under circumstances the most unfavourable; the globe of the eye was not only turned deeply inwards, but from the emaciation of the orbital contents, in common with the other parts of the body, it was also very much sunken, which rendered the operation difficult, notwithstanding I readily reached the muscle with the bent probe. It will be interesting to follow this case, with the view of ascertaining if the muscles, which have now been fifty-seven years accustomed to particular actions, may not eventually bring the eye to its proper position, the inner rectus muscle having been divided.

To this date (April 23) the patient has not complained of a single bad symptom, the healing process having gone on most satisfactorily.

Case II.—April 21, 1840. Mr. Crossland, aged 21, was born with his eyes straight. At Montreal, when five years of age, he was watching the return of his father from business at a time when a large quantity of snow was on the ground, the glare of light from which he observed to be very offensive, and was instantly seized with strabismus convergens of the left eye. He was quite unconscious of any deformity having occurred, until his friends remarked it to him. He was subjected to various kinds of medical treatment, and wore goggles. The summer following his eye got straight; but when the winter returned, it again became inverted, and has remained so to this date.

Present Appearance.—The eye is turned deeply into the inner canthus. When the right eye is covered the patient can turn the affected eye half-way outwards; but when both eyes are exposed, it instantaneously resumes its abnormal condition.

Mr. C. has been subject to headaches, reads a great deal, and for the last two years has been living on vegetable diet, for the cure of a cutaneous affection.

In the presence, and with the assistance, of Dr. Carroll, Mr. Toogood Downing, Mr. Wardrop, jun., and Mr. H. Downing, I performed the following operation:—A bandage was applied to the sound eye, to exclude the light, and the patient was seated on a low-backed chair before the window, and his head reclined against Mr. Doering's chest, who also supported the upper eyelid, by means of the wire speculum. Mr. Wardrop, jun., depressed the lower lid. The patient, who possessed great moral strength, everted the turned-in eye to his utmost, and with the greatest facility I introduced a small, fine-pointed hook into the inner conjunctiva, about three lines distance from the cornea, and with a very fine, straight knife I divided this membrane from below upwards, to the extent of half an inch, leaving the hook still attached to the inner segment of the incision. I next separated the divided inner portion of the conjunctiva from the subjacent sclerotic coat by means of a blunt probe, and having introduced between the lips of the incision the bent probe, I parted it underneath the tendon of the internal rectus muscle. The hook was now withdrawn and the operation was suspended for a moment. I next raised the tendon by means of the bent

probe towards the incision of the conjunctiva, so as completely to bring it into view, and with a curved scissors divided it. The eye immediately resumed its natural position. The hemorrhage did not amount to as much as two drops, and the operation was completed in a minute and a half.

Calomel, 2 grs.;
James's Powder, 3 grs. A saline draught in the morning.

22. The inner conjunctiva is slightly ecchymosed; the eye is perfectly straight. Mr. Crossland had a good night.

24. Ecchymosis of conjunctiva is disappearing. The state of the patient is most satisfactory.

26. The patient is in every respect going on well; he suffers no pain in the eye; the inner conjunctiva is still reddened, and a layer of lymph exists in the site of the incision; the redness evidently exists for the purpose of reparation, which is going on beautifully, as the patient was not aware of its existence until he saw it by means of a glass. He goes to business to-morrow.

CASE III.—April 27.—William James Egan, aged 10, was born with his eyes perfectly straight. When he was two years of age he suffered from convulsions, and after a more severe one than usual the strabismus took place.

Present State.—His left eye is turned deeply inwards, with a slight degree of obliquity upwards; its sight is not so powerful as that of the right; there is a slight degree of opacity of the inner circumference of the cornea, and the organ is more sunken than its fellow. With much exertion the patient can evert the eye to the extent of about four lines.

With the assistance of Mr. Downing, Mr. Bailly. Mr. Earles, and Mr. Snow, I performed this operation as follows:—The eye-lids were held apart simply by means of the fingers; I seized the inner conjunctiva with a small sharp hook, and divided this membrane from below upwards, with a fine narrow-bladed knife. At the instant of doing this the eye forcibly turned more inwards, which retarded the operation a few moments: keeping the hook still fixed in the inner segment of the divided conjunctiva, I allowed the lids to cover the globe, and a few drops of blood were wiped away by means of a sponge and cold water. Exposing the eye again by simply elevating the upper, and depressing the inner lids with the fingers of two assistants, I readily exposed the incision of the conjunctiva, and having separated the connecting reticular tissue by a blunt probe, as in the other cases, I introduced the blunt hook, and with much facility passed it from below upwards, beneath the inner rectus muscle, and drawing it forwards, I divided its tendon with a curved scissors.

The tendon of the muscle was unusually thick and strong, far different from the appearance which it presented in the other cases; it *grated* beneath the blades of the scissors upon dividing it, which, being accomplished, the eye became instantaneously straight.

The whole operation only occupied two minutes.

In this case the speculum was dispensed with, and the only instruments used were a hook, a knife, a probe, and a scissors.

After the operation a cold bread-and-water poultice was applied to the eye, a powder, consisting of James's powder and calomel, was given, and the boy was put to bed.

This little patient evinced great strength. I explained to him beforehand the object of the operation, and said he could assist us by everting his eye as much as possible, and which he did at the time it was most needed.

Remarks.—Were the operation of diving the muscles of the human eye for the cure of strabismus attended with danger to the organ of vision, with consequences of even a much less serious nature, the propriety of its performance might justly be regarded as questionable. But when it is considered that no bad consequences have followed this interesting operation,—that the patient suffers but little during its performance,—and that, in the cases to which it is applicable, the most gratifying success has attended it; its extensive application to the removal of strabismus cannot be too forcibly insisted upon.

As will be observed, on the perusal of the foregoing cases, and of those which have appeared in THE LANCET of April 18th, the operation for the cure of strabis-

mus which I have now successfully employed in five cases, differs in many, and I would say essential, particulars from that adopted by Professor Dieffenbach—indeed, when I first attentively considered the detail of the three cases as reported in the "British and Foreign Medical Review," I was struck with the number of hooks which were employed, and the necessity arising therefrom, for many assistants, who, in all operations, but especially in operations upon the eye, too often interfere with each other, and with the operator.

In Professor Dieffenbach's operation, no less than four hooks are employed, and one of these a double one; two for the purpose of keeping the eyelids apart, a third is passed into the conjunctiva, and the fourth, the double one, is fixed into the sclerotica. In none of the cases, with the exception of Catherine Cuthbert's, did I use more than one hook; and in the case of the child, Mary Anne Daly, I used none, having divided the conjunctiva with a knife and forceps. This latter instrument I have since found is not, for many reasons, to be depended upon as much as the hook; it gives more uneasiness to the patient, and is apt to lose its hold of the conjunctiva, which the hook never does until it is intentionally removed.

In deciding upon the best method of performing this operation, many circumstances must be taken into account in regard to the age of the patient; his moral courage; any cause which may disturb the relation of the orbit and its contents, so as to produce a too prominent eye or a too sunken one, as well as the degree of intensity of the strabismus.

In children it requires the greatest exertion to control their struggles. In the child Daly it was as much as two persons could do to steady her trunk and legs, the movements of which retarded the operation materially. On the contrary, in the case of Mr. Crossland, the great firmness he displayed, and the assistance he afforded me by everting his eye to the utmost, at the time I was passing the hook beneath the inner rectus muscle, rendered the operation almost bloodless, and enabled me to complete it in a minute and a half.

I have omitted to mention that I was indebted to the kindness of Mr. F. Kiernan, for the opportunity of operating on the boy Egan.

I have this moment seen the child, Mary Anne Daily; her eyes are perfectly straight, and a slight cicatrix is visible in the site of the operation.

London, April 23, 1840.

It gives us pleasure to be able to say that Dr. Hays, one of the Surgeons of Wills' Hospital, and Dr. Mütter, have performed the operation for strabismus, by cutting the internal rectus muscle.—*Ed. Eclec. Jour.*

IDENTITY OF PUERPERAL PERITONITIS WITH EPIDEMIC ERYSIPELAS.

BY R. HUTCHINSON, M.D., M.R.C.S.,
Physician to the General Hospital, Nottingham.*

The object of the communication was to state some circumstances tending to prove the frequent identity of puerperal peritonitis with epidemic erysipelas, and which occurred during a recent epidemic at Nottingham.

After excluding phlebitis and metritis, which the author considered to be by some writers comprised under the name of puerperal fever, and of which the imperfect discrimination, he thinks, may have introduced much of the obscurity and contradiction in the accounts and opinions of medical authors in reference to

* Communicated by Sir James Clark. Royal Medical and Chirurgical Society. Tuesday, April 14, 1840. Sir B. C. Brodie, Bart., President.

puerperal fever, the conditions of the weather preceding the epidemic are stated and the fact of the coincident prevalence of erysipelas and puerperal fever in the same neighbourhood and at the same time, is then stated. A case is then related at length, which the author judged to be one of puerperal peritonitis; it terminated fatally, but no anatomical inspection of the body was made.

Another case follows, also fatal, in which the peritonæal inflammation, with the effusions usually described in puerperal peritonitis, were ascertained on dissection.

A third case shows the occurrence in the same individual of peritoneal inflammation after delivery, and of erysipelas beginning in the left labium pudendi, and extending over large surfaces of the body, with vesications and sloughing of cellular substances. The treatment is detailed, under which the patient ultimately recovered.

These cases occurred consecutively, without the intervention of any other attendance on a case of labour, in the practice of the same accoucheur, and were followed by two other distinct cases of puerperal peritonitis, one of which, attended by the author of the paper, in the company of the same practitioner, exhibited repeated alternations of peritonitis and erysipelas on the surface.

The author then states that two practitioners, residing ten miles apart, met half way from the residence of each in attendance upon a patient suffering under extensive erysipelas of the legs, with sloughing, which required incision to be made, in which both were engaged in handing the parts affected. One of them the same evening attended a patient in labour, previously healthy, who died of puerperal peritonitis. The author draws from these observations a serious caution to practitioners, of the danger of communicating infection. He mentions, among other writers who entertained views similar to his own respecting the identity of puerperal peritonitis and erysipelas, Dr. Ingleby, of Birmingham, who, in the "Edinburgh Medical and Surgical Journal," 1838, speaks confidently of his conviction on the subject.

Dr. King, in illustration of the contagious nature of puerperal fever, stated, that some years since a practitioner, residing in Woolwich, lost sixteen patients from this disease, in the same year. He was compelled to give up the practice of midwifery for one or two years, his cases being divided among neighbouring practitioners. No case of puerperal fever occurred afterwards; neither had any of the neighbouring surgeons any cases of the disease in their own practice. During a period of practice extending over many years, he (Dr. King) had had not a single case of puerperal peritonitis, and this, he thought, was attributable to the facts of his never using ergot of rye, and his employment of calomel and opium in allaying any irritation which might occur after parturition.

Dr. Clendinning remarked, that the opinions expressed by the author were opposed to those generally entertained by the profession. He had had opportunities of treating both erysipelas and puerperal peritonitis, and of examining the bodies of persons cut off by them after death. The appearances presented in one of the cases detailed, were such as were usually observed in fatal cases of puerperal peritonitis, and were not those found in erysipelas. From his own experience he should consider the diseases under consideration to be quite different.

Dr. Merriman observed, that the idea of an identity between puerperal peritonitis and epidemic erysipelas, was by no means new; he had heard it expressed when he was a student; it seemed to have its origin in the fact of erysipelas and puerperal peritonitis being occasionally prevalent at the same time. He was rather surprised that the author of the paper should not, in support of the views he had advanced, have adverted to a circumstance sufficiently well known to practical men, viz., the great number of cases of erysipelas infantile which occurred after the death of the mother by puerperal fever. He had seen many such cases in which the mother died of puerperal fever, and in a few days after her infant was seized with fatal erysipelas. He recollected one case particularly which illustrated the point he had just alluded to, as well as the contagious nature of puerperal fever. He (Dr. Merriman) was requested to be present at

the examination of a woman who had died of puerpera l fever. He took care not to touch the body. This occurred at two o'clock in the day. At nine the same evening he was called to a labour, the woman was so near being delivered when he arrived, that he had scarcely anything to do; the next morning she had severe rigors, and in forty-eight hours was a corpse; her infant was seized with erysipelas, which proved fatal in two days.

Mr. Gregory Smith would mention a fact which bore somewhat upon the question under discussion. The body of a woman, who had perished from puerperal peritonitis, was brought to the dissecting-rooms, in Little Windmill-street. Having had a desire to pass his hand from the uterus into the vagina in a case of the kind, he did so on this occasion. He was instantly seized with a painful sensation along the back of the hand and up the arm, to the point where it ceased to come in contact with the body. He bathed his hand in warm water for some time, but suffered considerably from pricking and pain in the hand and arm. In the evening he felt feverish and unwell, and was awoke in the night by pain in the hand and arm, which he found, in the morning, to be covered with distinct pustules. These continued for several days. He tried to inoculate one or two students with the fluid taken from these pustules, but the only result was an irritative wound, which healed in a day or two.

Sir B. Brodie observed, that it was well known that the inoculation of lymph or pus, from the peritonæum of a puerperal patient, was often attended with dangerous and even fatal symptoms. With regard to the contagious nature of puerperal peritonitis, an anecdote was told of the late Dr. John Clarke, to the effect, that on this disease appearing among the patients, he was induced to destroy his entire wardrobe, and no case of the kind occurred to him afterwards. There was a class of cases bearing somewhat upon the question mooted by the author of the paper, and of which he (Sir Benjamin) had seen several instances. About seventeen or eighteen years ago, he operated upon a patient with a fistula in ano. Soon afterwards the wound was surrounded with erysipelatous inflammation, which, in a day or two, had involved the entire of the buttocks, and then suddenly disappeared; the patient was now seized with pain in the abdomen, which was tender and swollen; there was much constitutional disturbance; in fact, all the symptoms of peritonitis were present; he died in eight days. After death there was found to be unusual vascularity of the mucous membrane of the intestines, spreading upwards from the rectum, and the peritonæum exhibited the usual signs of acute inflammation. He had seen four or five cases in which, after operation for fistula in ano, there was a blush of erysipelas; this disappeared suddenly, and the inflammatory symptoms supervened.

BIBLIOGRAPHY.

MEDICAL ASSOCIATION OF IRELAND.

We have received, as if to fix our attention fully on the subject, no less than three separate copies of the Dublin Medical Press for June 3d, of the present year, with a Supplement. The number is almost entirely filled with an account of the resolutions, speeches, and other doings of the "Medical Association of Ireland," at its first anniversary meeting, held in Dublin, on the 27th May. An opening address was made by the President, Richard Carmichael, Esq. The spirit of reform is abroad and active in all parts of the United Kingdom; manifested in medical associations, whose object is to elevate the standard of medical character and attainments, by requiring a better system of education, or rather stronger and more valid tests of preparedness for medical and surgical practice than at present are to be found. Much of what is objected to on the other side by the medical reformers exists, and requires removal, here; and hence a notice of their proceedings,—their trials, difficulties, and probably ultimate success, will have more than a merely passing interest to the profession on this side of the Atlantic. Mr. Carmichael states, that the objects of his associates assembling, is for them to agree upon the principles upon which reform ought to be based, and to

consider the best means of afterwards accomplishing our object. "Already have upwards of fifty petitions from this, as well as various other associations of our brethren in England and Scotland, been presented to Parliament, which, proceeding from such great masses of enlightened and well educated men, neither the legislature nor the government *can* overlook. The voice of such men *must* be heard and listened to with attention. The people have not as yet come forward to petition Parliament on a subject, in which *their* interests are truly more deeply concerned than ours; but ere long, they will be awakened from this apathy to a just sense of the advantage of having none *but* well educated practitioners, to whom they may, with confidence, entrust the care of their health and lives. Men whose competence for this important duty has been ascertained, and tested by the most trying and searching examinations. That men incompetent to the due performance of this duty, who call themselves physicians and surgeons, are everywhere to be met with, is obvious to every one, and is beyond the necessity of proof. But it could not be otherwise, since there are eighteen chartered Corporations or Colleges in the united empire, empowered to grant licenses to practice; which instead of competing with each other, to supply for the public service, the most highly qualified and well informed practitioners, on the contrary, exert a miserable rivalship, only in the accumulation of money. For, in proportion to the number of candidates upon whom any College confers its diploma, so much the greater number of fees it obtains; and, consequently, the public is inundated with incompetent and half educated men. This statement may, by many, be esteemed exaggerated or untrue; but, in its support, I shall advance a fact, which is well known to numbers around me. The Irish College of Surgeons, maintained, for many years, a high character for the rigour of its examinations, which caused its diploma to be everywhere respected. But of late years it has been induced to swerve from the high tone it had adopted, and lower its examination to the level of other Colleges, otherwise it would have scarcely a candidate for its diploma—*Ab uno disce omnes* (hear, hear). We may, therefore, infer what the result must be, when eighteen licensing bodies thus contend, as in a Dutch auction, to sell their honours to the lowest bidders in point of qualification, which sufficiently accounts for the crowded and wretched state of the medical profession, and the number of ill-informed and half-educated practitioners who are every where to be met with. This state of the profession calls loudly for legislative interference, to prevent a continuance of the evils which must in consequence be inflicted on society (hear, hear)."

How far the evils thus deplored by Mr. Carmichael prevail in the United States, and what is the urgency for relief and reform here, must be pretty obvious to every intelligent physician. In Great Britain and Ireland the profession looks for a change through the decrees of the national legislature—the Imperial Parliament. In this country we cannot make a similar appeal to Congress with any effect, each State having the power, and deeming itself competent, to take cognizance of, and regulate all matters of education within its bounds. To the legislature of each State, therefore, must the physicians who reside in its bounds, direct their appeal for reform. They need not wait the action of those who reside in the great cities, who are often trammeled by a spirit of corporation, or coterie, or a love of ease, and an aversion to encounter the occasional frown of those with whom they have frequent and friendly intercourse. It is high time for all the members of the profession in the United States to be up and doing, if they would not see themselves degraded in public estimation to the mere level of quacks; and, what is worse, feel that their average attainments are not of a much higher order than those of the latter. Reform, to be useful, ought to be searching and general, and in order to be so, long time and much labour must be consumed. We ought to ascertain fully our real position, our deficiencies, and the means of obviating them; and of establishing at the same time a better system, which should be the fair expression of the educational capabilities of our American teachers, and the real

wants of American students, in reference to the requirements, which may, and ought to be, reasonably made of them by the people whose health they profess to take charge of, and whose diseases to cure. In the progress of preliminary investigation our attention ought to be fixed on our own condition ; and even in the ameliorations and reforms which the former may show to be necessary, although we may take hints from foreign institutions and laws, we cannot usefully adopt any of these as our models and standards. No hasty application of a partial revelation of existing abuses can be made to the disparagement of this or that existing medical school, or of the course pursued by a few medical teachers. We must be prepared with adequate knowledge, and in the right feeling; which knowledge, laboriously acquired, goes to make an entire change in the system, not merely in one city or state, but in all parts of the United States. Let the reform emanate from, and be sustained by the great body of the profession through the country, and not left to the caprices and selfish calculations of a few, and great will be the good. There are, doubtless, many medical societies now in existence, which might at once be made medical associations for reform : but the composition of many others is such as to prevent salutary action, and in such case new combinations are required for this express purpose. It is not to be expected, for example, that professors in existing medical colleges should take a very active part in furthering measures to curtail their number and abridge their privileges. No person ought to blame them if they are lukewarm, or even if, on occasions, they interpose their adverse opinions to reform. It is time enough to require them to act when they see the properly matured plans of the great body of the profession placed before them.

Mr. Carmichael proposes, as part of a plan of reform, that "there should be but three licensing bodies—one in each capital of the empire—(London, Edinburgh, and Dublin,)—which should, by frequent communications, preserve uniformity of education and equality of examination. By this arrangement the standard of qualification may be brought to the highest pitch compatible with the wants and interest of the public ; and it is only in this way that the ranks of a profession, at present crowded to excess, and sadly interfering with each other, can, *even in prospectu*, be legitimately thinned (hear, hear)."

In the United States it has always been found convenient for a doctor to practice both medicine and surgery ; and, therefore, we do not require here the change which Mr. Carmichael and his fellow reformers call for, viz : that "the license obtained in the manner indicated above should permit the possessor of it to practise either physic or surgery, or both, in every part of the empire. In large cities and communities, individuals may find it their interest to restrict their practice to one or other of these divisions of the healing art. In small towns, on the contrary, the same individuals will be called upon to practice both branches for which, under the proposed reform, he would be amply qualified. In villages and remote districts it may be necessary for the interests of the people that the same individual should also be permitted to practise pharmacy." In these particulars we are in advance of our brethren on the other side, in our practically carrying out those which they only suggest as expedient hereafter to be done. Our belief in this country of the propriety of the following recommendation of Mr. Carmichael, has been manifested also by appropriate regulations in some of our chief cities, particularly in Philadelphia, in which a College of Pharmacy has been, for some years past, in practical and efficient operation. Mr. C. says :

"The interests of society require that the practice of medicine and pharmacy should be kept as distinct as possible; and, therefore, it is proposed to establish, in addition to the colleges of medicine, three great colleges of pharmacy, one in each metropolis—and that no person shall be entitled to *vend* or *charge for* medicine who does not receive his diploma from one of these colleges (hear, hear)."

Drs. Maunsell, Jacob, O'Beirne, Porter, Williams, and others of note, some of them professors in existing schools, are members of the Irish Medical Association. The importance of the subject will induce us to revert to it ere long.

THE ANATOMY OF SUICIDE: By FORBES WINSLOW, Member of the Royal College of Surgeons, London; Author of Physic and Physicians. London. 1840. pp. 339, 8vo.

THE title of this work was probably suggested by that of the "*Anatomy of Drunkenness*," by the late Dr. McNish, as this again was derived from the ever celebrated "*Anatomy of Melancholy*," by the melancholy Burton, himself a case in the Clinics of Suicide. The present work has more substance, and evinces more reading and reflection than "Physic and Physicians," which, before we had made much progress in its perusal, would, we hoped, be appropriate to the "Library:" but we found it of too light a texture for this purpose. There is in the volume before us an abundance of materials for philosophical inductions and ethical reasonings, but which the author does not seem to have wrought out to the requisite extent and fulness. His application of the subject to medical jurisprudence strikes us as meagre and imperfect; in his often substituting assertion for proof, and opinion for close argument. Evidently he has not accustomed himself to this branch of medical study; at least he has hardly gone beyond its mere outlines or anecdotal portions. The work seems to be intended for perusal by the general reader, as well as, if not rather than, the medical; and, so far, it is not calculated, we conceive, to answer a good purpose. So strong is the propensity in the human mind to dwell on and imitate follies and atrocities, which excite at first an emotion of disgust if not of horror, that a carefully made record of these things goes much farther to familiarize us to them, than to prompt to shun and detest them. There is, we believe, scarcely a narrative of suicide, particularly if it be of an unusual fashion, which does not give strong probability of some one who reads or hears it being induced to commit a similar act. We repeat, therefore, the expression of our fears, that an attempt to popularize these narratives, will also engender a repetition of the deeds which they record. Hence, although we are not of the number of those who believe in the efficacy of a studied painting of every history of folly and vice with a moral; yet in the cure of suicide we deem it to be the clear duty of every person, whilst he is yet in the possession of his senses, to explain the causes of a man's making away with himself—to be either insanity, or an excessive childlike or mere animal impatience, and more than brutish stupidity; by the first of which, at the very best, from his own showing, he throws a mantle over his face, and determinately blinds himself because he cannot pursue the path he likes, or has for a time wandered from it. A person who can be supposed to have been in his senses when he commits so senseless an act as suicide, leaves a body which can be regarded with no more respect than that of a dead dog. He has lowered himself beneath the standard of the living animal by his last act, and ought not to expect that the lodging of so poor, and craven, and stupid a spirit should be treated

better than that of the quadruped. This may sound harsh and grating to some sensitive minds compassionate of other's follies as well as of other's suffering; but a little reflection will suffice to convince even them that our view is the most humane, besides being the truest, if measured by its practical application as a discouragement against the sin of suicide. Even if we suppose, which indeed we can hardly doubt, that generally the act is done in a moment of insanity,—this very morbid frame of mind itself has been sometimes created, often exasperated by false philosophy—the horrible dogma, that a man has a right to take away his own life, rather than by living to remain a burthen to himself and to his fellow men. The philosophy would be quite as sound, and sustained by as plausible arguments, which went to justify a man in murdering another person, because, for example, the latter may have been a criminal in the eye of the law; or a drone, and worthless in the eye of the political economist; or a cipher, a bare entity in the opinion of a man of genius.

Mr. Winslow examines the subject of suicide in nearly all its external bearings, by giving the history of opinions as well as of practice in regard to it among both ancients and moderns—philosophers so called, and fools without dispute. Thus, he begins with a notice of the *Suicides of the Ancients, and of the ancient laws and opinions on the subject of suicide*; then he speaks of writers in its defence. He properly considers afterwards *suicide a crime against God and man, and that it is not an act of courage.*

Stress, even in modern times, has been laid on the example of suicide set by the second Cato, who destroyed himself rather than submit to the clemency of Cæsar. But, so far from this act being regarded as a proof of magnanimity, it ought rather, as the author very properly remarks, to be stigmatised as the effect of pride and timidity. It was no longer the noble Roman, intent on his country's welfare, and willing to sacrifice present show of dignity for her ultimate good; but a proud, self-willed, and disappointed old man, who in a moment of spleen could thus desert Rome in her time of greatest need. With a little more prudence, and little less intolerance of another's temporary ascendancy, and probably, also, less private pique against the victor at Pharsalia, he ought have lived to see the dead rather than the triumphant Cæsar; and have become the centre and hope of the true friends of liberty, by his strengthening the party of Brutus and Cassius, and making it successful in restoring, for a while at least, free institutions to his country.

"It appears that the Roman laws respecting suicide were of a fiscal nature. They viewed the act not as a crime abstractedly, but considered how far the circumstance affected the state or treasury. In some portion of the Roman empire the magistrate had the power of granting or refusing permission to commit suicide. If the decision was given against the applicant, and he persisted in sacrificing his life, disgrace and ignominy were heaped upon his body, and it was buried in the most humiliating manner."

So little can short-sighted man foresee his future fortunes, that even in the period of the greatest depression, events are in preparation which will give an entirely new colouring to his life, and raise him from despair to hope and joy. One among many examples of this truth is given in the reply of Napoleon to some persons who thought that he ought, after his downfall, to have played the Roman, and put an end to his life: "If Marius had slain himself in the marshes of Minturnæ, he never would have stood the seventh time for consul." So, also, to give an illustration in the person of the French emperor himself, we might

say: "If Napoleon had slain himself after his abdication at Fontainbleau, or on his way to exile in Elba, he never would have again traversed France, and shown to all Europe the intense enthusiasm of the people in his favour." And even after the disastrous day of Waterloo, had he; like Otho, destroyed himself, he would have been prevented from dictating those memoirs commemorative of his military career, and of his legislative and judicial skill which he prepared at St. Helena, and which will make his name a wonder long after it has ceased to be a terror among the nations of the earth. His suicide would have put the seal to the condemnatory declarations of his enemies:—his subsequent life has given him the stamp of truer greatness than was derived from his victories and conquests.

It is correctly remarked by Mr. Winslow, that "the alliance between suicide and the murder of others is a closer one than is generally supposed. How many instances are recorded in which suicide and homicide have been conjoined. He who will not scruple to take away his own life, will not require much reasoning to impel him to sacrifice another's." Numerous are the proofs of this last assertion furnished in the public journals of Europe within the last few years.

Touching *the influence of certain mental states in inducing the disposition to suicide*, we learn, on the authority of Falret, of 6782 cases which occurred between 1794 and 1823 (in Paris), 254 were from disappointed love, and of this number 157 were women; 92 were from jealousy; 125 from being calumniated; 49 from a desire, without the means of vindicating their character; 112 from disappointed ambition; 322 from reverses of fortune: 16 from wounded vanity; 155 from gambling; 288 from crime and remorse; 723 from domestic distress; 905 from poverty; 16 from fanaticism. In a period of sixty years, or from 1770 to 1830, there were 7290 suicides in London—of which 4337 were men, and 2853 women. Poverty is the chief cause, giving no less than 1416, of which 905 were men, and 511 women. Domestic grief figures in the proportion of 728 men, and 524 women. Reverse of fortune 322 men, and 283 women. Drunkenness and misconduct 287, and 208 respectively. Gambling 155 and 141. Grief from love 97 and 157. But then from causes unknown there were 1381 men, and 377 women.

Among the mental causes of suicide are enumerated remorse, unrequited affection, jealousy, mortified pride, despair. A *blind impulse* is mentioned by the author among the causes of this crime. We must suppose that in a vast majority of instances of suicide, although the passions unrestrained are the predisposing causes which unsettle the mind, yet that this blind and insane impulse is the immediate one. The following will represent a great number of cases, and will serve to point out to both the intender of suicide and his physician the means of prevention. Moral exhortations and religious appeals have no influence during this temporary delusion, the result of morbid cerebral excitement, which is either primary, and the excessive operation of the mental faculties; or secondary, and the transmitted irritation from disorder of the digestive and chylopoietic viscera in general. After the paroxysm is over, then will attempts to justify the better principles of the individual, by moral and religious precepts, be made to a good purpose. But we have withheld the case in illustration. It is as follows: "A gentleman, a merchant of the city of London, had been exposed to great mental perturbation; his nervous system had received a severe shock. He suffered extremely from a dread of going mad. As he was walking home one afternoon, he heard a voice say, "Kill thyself," "Commit suicide;" and from that moment

he could not banish the idea from his mind. Two or three times he was on the eve of obeying the mandate of this internal voice; but he frequently possessed sufficient resolution to resist the temptation. In this state of mind he consulted a physician, who ordered him to be cupped in the neighbourhood of the head. His bowels were attended to, and he was recommended to visit some friends in the north of England, and to banish from his mind all ideas connected with business. He followed the advice of his judicious physician, and in a short time he completely recovered."

"A timely-administered purge has been known to dispel the desire of self-destruction. Esquirol knew a man who was decidedly insane whenever he allowed his bowels to be in an inactive condition.

"A patient of Falret had well marked suicidal delirium. So urgent were the symptoms, that he was placed under restraint and carefully watched. Active cathartics were administered, and Falret states that the largest tape-worm he ever saw was evacuated. The idea of suicide soon vanished, and the man was restored in perfect health to his friends and family.

"Foderé examined the bodies of three persons in one family, who fell by their own hands, and in the three cases considerable disease was discovered in the intestinal canal, which had been irritating the brain, and disturbing its manifestations. In the instances just referred to, the indication of physical disease of the *primæ viæ* were but trifling during life.

"Disease of the stomach and liver frequently incite to suicide; hepatic affections notoriously disturb the equilibrium of the mind. Many a case, exhibiting an inclination to suicide, has been cured by a few doses of blue pill. The physician should direct his attention to the condition of the uterine function, and the state of the skin. During the puerperal state, a tendency to suicide is often manifested.

"A lady, shortly after her accouchement, expressed, with great determination, her intention to kill herself. Her bowels had not been properly attended to, and a brisk cathartic was given. This entirely removed the suicidal disposition.

"Any irregularity in the action of the uterine organ may give rise to the same inclination. Under such circumstances emmenagogues will do much good.

"German writers dwell much upon the connexion between suicide and derangement of the cutaneous secretion. That this function should also be attended to there cannot be a doubt, although we cannot call to mind any cases of suicide which could be directly traced to suppressed perspiration."

We are led naturally from a mention of the internal or corporeal causes of suicidal mania, to indicate a part of the physical treatment, which consists in altering the condition of the organs; and, in doing so, we find ourselves copying from the tenth chapter of Mr. Winslow, having passed over some chapters intermediate between this and the one on the influence of certain mental states in inducing the disposition to suicide. Before we notice these, we must repeat an anecdote related of an Englishman and Voltaire, which is in point, to show how the mind is influenced in its tone and temper by the operation of physical agents, both external and internal.

An Englishman and Voltaire concluded a discourse one evening on the depravity of mankind, and the little motive for remaining on this earth, subject, as they were, to other's tyranny and injustice, and the various inflictions of disease—by a joint resolution to commit suicide on the following morning. The Englishman, firm to his resolution, rose, and expected Voltaire to perform his promise, to whom the genius replied, "*Ah! monsieur, pardonnez moi, j'ai bien dormi, mon lavement a bien operé, et le soleil est tout-à-fait clair aujourd'hui.*"—Ah! sir, excuse me, I have had a good night's sleep; my clyster has operated well, and the sun shines brightly to-day.

The fifth chapter is on *Imitative, or Epidemic Suicide*, and contains a number of

examples of the tendency of the human mind to imitate various atrocities, including suicide, after these had been witnessed or their performance narrated by others.

"Gall informs us of a man, who in reading in the newspapers the particulars of a case of murder, perpetrated under circumstances of peculiar atrocity, was instantly seized with a desire to murder his servant, and would have done so, had he not given his intended victim timely warning to escape.

"Some years ago, a man hung himself on the threshold of one of the doors of the corridor, at the *Hotel des Invalids*. No suicide had occurred in the establishment for ten years previously; but in the succeeding fortnight, five invalids hung themselves on the cross-bar, and the governor was obliged to shut up the passage."

Sydenham informs us that at Mansfield, in a particular year in the month of June, suicide prevailed to an alarming degree, from a cause wholly unaccountable. The same thing happened at Rouen, in 1806, at Stuttgard, in the Valais, in the year 1813. One of the most remarkable epidemics of the kind was that which prevailed at Versailles, in the year 1793. The number of suicides within the year was 1300—a number out of all proportion to the population of the town, which at that time probably did not exceed fifty thousand inhabitants. At present it is as low as thirty thousand.

Most readers of history have heard of the epidemic at Miletus, which displayed itself by the ladies of the city destroying themselves by hanging, in the absence of their husbands and lovers, and of a similar mania at Athens, but without, we believe, the same plausible excuse. Writers are not agreed in respect to which of these two cities, the cure and prevention were found, by exposing naked, in a public place, the bodies of the last suicides.

The title of the following chapter, Suicide from Fascination, is not very clear. In it the author introduces accounts of several persons, who in their extreme curiosity to know the sensations of those who suffered death by hanging, drowning, &c., subjected themselves to trials, by suspension, and by immersion in water, which, but for the fortunate and sometimes accidental intervention of others would have proved fatal. As more particularly illustrative of a kind of fascination causing suicide, Mr. Winslow instances the confessions of a desire to jump off from an eminence or a precipice, and still more, and worse, actual self-destruction by this means. "Persons who are subject to feelings of this character, should be advised to avoid ascending elevated places."

Of the enthusiasm and irritability, which, if encouraged, would lead to suicide, is the heading of the seventh chapter of this work. There are some silly parents, and equally silly friends, whose chief endeavour would seem to be to nurture into insane exhibition this morbid irritability in place of soothing it, and directing the intellect and feelings into safe channels, by holding out inducements for regularly daily and common-place occupation.

The science of statistics, or the application of numbers to the verification of medical opinions, will correct many a popular notion and scientific dogma. Among those is the assertion that the changeable, and particularly the foggy climate of England, is favourable to suicide. In the chapter on the *Physical Causes of Suicide*, Mr. Winslow shows that in Holland, the climate of which is much more gloomy than that of England, there are fewer suicides than in the latter country, whilst in France, more favourably circumstanced on the score of a friendly sky, there are more instances of this catastrophe. The average number of suicides in London (or England?) shows the months of April and June to have the preference; and November to exhibit the least. The proportion of suicides in November is to those in April, as 3 to $8\frac{1}{4}$. At Paris the larger number of suicides occur in spring and summer. "When the thermometer of Fahrenheit ranges from 80° to 90° suicide is most prevalent." On the contested point, of which people, the English or the French, is most addicted to suicide, the author says: "It has clearly been exhibited that where there is one suicide in London, there are twelve in Paris." We should like to see the data on which this assertion is made. The comparisons made in the work before us are of different periods in the two capitals: "Out of 120,000 persons who insured their lives in the London Equitable Insurance Company,

the number of suicides in twenty years was only fifteen; so much for the English being, *par excellence*, disposed to suicide."

On the subject of ætiology, the following paragraph is worthy of especial note, not on account of its novelty, but as a text for continual and much more vigilant, and open, and manly dissuasion from indulgences in the bottle, than many, shall we say most, physicians are inclined to attempt.

"It has been already established by statistical evidence, that in a very large proportion of cases of insanity, admitted into the asylums and hospitals devoted to the reception of this unhappy class of patients, the mental impairment can clearly be traced to habits of intemperance." The inhabitants of the wine countries of Europe are not exempt from the vice which causes, nor the penalty paid for, insanity thus brought on.

Of the disposition to suicide induced by indigestion and hypochondriasis, we have too many melancholy examples; among the most interesting, perhaps, of which is that of the poet Cowper, who was at one time unquestionably insane, and who, in a fit of insanity, attempted his own life. The hereditary predisposition to suicide would seem to be a well established fact: nor is there anything in this to surprise. Suicidal propensity is a variety of monomania; and, as such, may, like other varieties of the disease, be transmitted from parents to offspring.

The *moral treatment of suicidal mania* would almost suggest itself to a physician of cultivated mind and correct taste, even without the aid of clinical experience. It should consist in regular occupation of the mind of the sufferer, short of actual fatigue; an engagement of his feelings in an observation of the beauties of nature; and cultivation of taste for the arts and letters. Determined volition, early enlisted, will go far towards dispelling gloomy thoughts, and substituting pleasanter ones in their stead. If change of scene be thought, as it is, desirable, the patient should be encouraged to travel; at any rate to leave his own home, and thus break up the morbid associations by which his mind has been enchained. Music has often exerted a salutary influence in dispelling the melancholy which leads to suicide, as well as in relieving some other varieties of insanity. In fine, if we would produce any beneficial change in the mind of the patient, it must be by action, and not so much by mere appeals to, as by continuing to occupy and to enlist his feelings and faculties generally in some regular and yet pleasing circle. Mere preachments about the regulation of the passions will be as nought unless we can show him how to repress inordinate and extravagant emotions, by enabling him to substitute allowable and healthy indulgence in the affections.

But important as we may deem the moral treatment, it is only auxiliary to the physical treatment, the chief outlines of which have been already traced. In the inception of the disease, and during what may be called its paroxysmal period, when the patient is eagerly intent on self-destruction, we may be pretty sure that the brain is in a morbidly excited state, and we ought to shape our measures so as to abate it. With this view we should act directly on it by the detraction of blood, either by v.s. or by cups and leeches, or by cold applied to the head, and warmth to the lower extremities. If the symptoms indicate derangement of the digestive canal and apparatus generally, this is to be corrected, and by such means the brain will often be entirely relieved. But after a prolongation of the disease or repeated returns of the paroxysm, or even primarily in certain constitutions debilitated by various excesses, the brain is in a state of high nervous, but not inflammatory excitement, and requires to tranquilize it, the use of opium and analogous preparations, and the warm bath during the paroxysm; and mild tonics during the interval. On these latter we cannot, however, lay much stress: the chief and indispensable means of restoration being active bodily exercise, if possible, accompanied by change of object and scene in the open air.

If the disease, suicidal mania, is evidently fixed, that is, if it goes beyond a mere passing desire to commit self-murder, then ought the subject of it to be subjected to the same rules and precautions—hygienic, medicinal, and moral, which are had recourse to in other cases of insanity. Among these, seclusion in a house or establishment away from the residence of the sufferer, and a strict surveillance, will be regarded as important.

Mr. Winslow devotes a chapter to the question—*Is the act of Suicide the result of Insanity?* The whole history of the subject tends, we think, clearly to an

affirmative reply. The next chapter on *Suicide in connexion with Medical Jurisprudence*, is followed by another on the *Statistics of Suicide*; as this again is by one on the *Appearances presented after Death in those who have committed Suicide.* The fifteenth, and concluding chapter, is *Singular Cases of Suicide.* We shall conclude by an extract from the chapter, which is a short one, on the *post mortem* appearances of those who have destroyed themselves.

"From an examination of the particulars of 1333 cases of persons who have committed suicide, and who have been examined after death, the following analysis is made. The particulars of the cases referred to are recorded in the works of Pinel, Esquirol, Falret, Foderé, Arntzenius, Schlegel, Burrowes, Haslam, &c.

Thickness of cranium,	150
No apparent structural change	100
Bony excrescences	50
Tumours in brain	10
Simple congestion	300
Disease of membranes	170
Disease of lungs	100
Softening of the brain	100
Appearances of inflammation in brain	90
Disease of stomach	100
Disease of intestines	50
Disease of liver	80
Suppressed natural secretions	15
Disease of heart	10
Syphilitic disease	8
	1333

Accretions of the membranes of the brain are often found in suicides. The dura mater is often ossified, and the pia mater inflamed, and the arachnoid thickened. Osiander considers congestion of the vessels of the brain a frequent cause of suicide."

Annual Circular of the Medical Institution of Yale College,—for the Lecture Term of 1840–41.

In reference to the "Lecture Term" at this flourishing institution, we read that "The course of Medical Lectures commences annually at the expiration of six weeks from the third Wednesday of August, and continues sixteen weeks. The next term will commence on Thursday, October 1st, and continue until Wednesday, January 20th, 1841. Each of the Professors meets the class daily, except the Professor of Obstetrics, who lectures three times a week."

The fees for the whole course are $76. The price of board, room, &c., at New Haven, is from $2 50 to $3 50 per week, according to the accommodations required.

"Degrees and Licenses.—By the statutes of the State, the requirements of candidates for the Degree of Doctor in Medicine, are three years study for those who are not Bachelors of Arts, and two years for those who are; attendance upon two full courses of lectures, either at this or some similar institution; the attainment of twenty-one years of age; and a good moral character; together with a satisfactory examination before the Board of Examiners for the State, at which the candidate must present a dissertation on some subject connected with the medical sciences. The Board of Examiners consists of the six professors of the Institution, *ex officiis*, and an equal number of persons by the Fellows of the Connecticut Medical Society; the President of the Medical Society is, *ex officio*, President of the Board. The graduation fee is $15.

Candidates for license to practice physic and surgery must possess the same qualifications as those for degrees, except that attendance upon one course of lectures only is required. The licenses are granted by the President of the Connecticut Medical Society, on the recommendation of the Board of Examiners. The fee for a license, including diploma, is $4 50.

The examination is held immediately at the close of the lecture term, when the licenses are granted and the degrees conferred."

A good feature in the above regulation is the examination for degrees by a Board of Examiners, one half of whom have no professional connexion with the institution. But the distinction made between doctor and licentiate is an unfortunate one. The opportunities for acquiring knowledge by attendance on lectures possessed by a candidate for the doctorate are far from being too ample; and the requirements in this respect ought not to be abridged in favour of a licentiate. It is not the mere question of title, but of the qualifications to practice medicine in its various branches, in which the community has such a deep interest. If, therefore, the licentiate can be qualified by one course of lectures, it is injustice to ask an attendance of two from the Doctor. If two courses are required to fit a person to practice properly, as well as to acquire a degree, then is injustice done to the community, by allowing the licentiate to go abroad and take charge of the lives of his fellow-citizens. We are aware that the same objection may be brought against the Medical College of Philadelphia, in which there are two degrees, that of Bachelor, and of Doctor, of Medicine. But in this case, the former is placed on a par at once with the highest existing standard of doctorate in the other medical institutions of the commonwealth; and the latter is intended to represent more extensive qualifications than have as yet been thought necessary in conferring the degree.

LECTURES ON THE THEORY AND PRACTICE OF PHYSIC. By WILLIAM STOKES, M.D., etc. Second American edition. With numerous notes, and Twelve additional Lectures, by JOHN BELL, M.D., etc. Philada. Haswell, Barrington, and Haswell. Pp. 672, 8vo., 1840.

IN conformity with usage, we notice the publication of this work, as we do of all those of which copies are sent to us: but we cannot be expected to discharge in this instance our customary editorial duties by a critical review. We shall merely say that the publishers have redeemed the promise set forth in their advertisements, both in regard to the time of the publication, and the extent of the additions made by the editor. The new matter amounts to two hundred and fifty pages. With the heads of the topics treated of by Dr. Stokes, and of those introduced in the notes and additional lectures by Dr. Bell, the reader will become acquainted by reference to the Contents and Preface to the work, affixed to the present number of the Journal.

AMERICAN JOURNAL OF THE MEDICAL SCIENCES.

THIS valuable work, which has acquired a hold on the affections of the medical profession in the United States, not more by its age than by its substantial merits, will, we learn from the announcement of its editor and publishers, appear in January in place of November next.

THE MEDICAL COLLEGE OF PHILADELPHIA.

THE Corresponding Secretary of this institution, John Bell, M.D., will be much gratified by receiving from time to time, from the officers of the different medical institutions, of all kinds, in the United States, the official publication of their rules and proceedings. The authors of dissertations and lectures on Medical Education, will also confer a service by forwarding to him their productions on this subject. Information thus acquired will be made useful for the benefit of the profession at large in the United States, by its members and association acquiring a knowledge of each other's plans and progress, and the measures adopted to promote their common welfare, which is inseparably allied to that of the public at large.

THE lecture on the "Diseases of the Veins," in our last number, was derived from the *London Medical Gazette.*

as it ascends from the pelvis, distending successively each portion of the tube, and at last being arrested by the spasmodic closure of the œsophagus, forming the *globus hystericus*. These phenomena gave origin to the hypothesis that the uterus ascended from the pelvis, and to the consequent treatment by fetid scents to the nostrils, and fragrant fumigations of the vulva.

Tympanitic abdomen is caused by an increased secretion of these gases, analogous to the other hysterical profluvia, namely, from the uterus, skin, salivary glands, and kidneys. It is occasionally so enormous as to give the patient the appearance of advanced pregnancy. Some of the older writers attribute the non-expulsion of the gas to paralysis of the muscular fibres of the colon. Most probably this explanation is correct.

Paralysis of the colon, rectum, and bladder, causing *constipation* and *retention of urine*, is a real paralysis, and would appear exactly analogous to that which affects the larynx, pharynx, and œsophagus, causing aphonia and dysphagy.

It has been advanced by Sir B. C. Brodie,* that this affection of the bladder is owing to the absence of all exercise of the volition. Nothing is directly stated in support of the opinion. The effect of strong moral emotion in overcoming the paralysis, may be thought corroborative. The effect of sudden surprise or terror in giving the power of locomotion to helpless paralysed patients has been frequently recorded, yet it has never been denied that in these, at least, there was a real paralysis. The hysterical retention of feces and urine may arise from deficient irritability of the mucous membrane of the viscera implicated, or there may be spasm of the sphincter resisting the usual contractions. In the one case distention by increasing the stimulus will relieve the retention; in the other, a moral cause will relax the sphincters. It must not be forgotten that the retention of urine is frequently connected with a partial suppression, so that we have diminished muscular power, diminished irritability, and diminished stimulus, all combining to produce that symptom. The effect of mental excitement in exalting and lowering the muscular power of individuals in good health is well known, but is a fact too generally applicable to be useful in illustration of the symptom under consideration, except in the same general way.

A patient with hysterical aphonia will certainly make the most painful and energetic efforts to articulate, without success.

The presence of *Scybalous feces* in the rectum and colon is a cause of constipation in hysteria, and probably occasionally of tympanites. They seem to be dependent on diminished secretion from the mucous surface of the intestines, or paralysis of the muscular fibres.

Diarrhœa, mentioned by Sydenham, Whytt, Pomme, and others as a symptom of hysteria, is the converse of this, and may be classe

* Lect. in Med. Gaz., vol. xix., p. 246, also on Local Nervous Affections, p. 48, 8vo. London, 1837.

with the profluvia already noticed. Its occasional monthly recurrence has been already mentioned; it will also assume the hebdomadal or tertian type.

Colic is a well-known and very distressing affection of the hysterical, and in the majority of cases arises from confined flatus distending the colon. A pain which

—"Vero longè dirissimus occupat omnem
Inflexi tortum coli, rem nomine monstrat."*

It may be doubted, however, whether the pain be invariably seated in this portion of the intestine. I have witnessed a severe attack without any very obvious flatulent distension, and the latter to an enormous extent, without causing any colicky pains whatever. It may be, on some occasions, neuralgia of one or other of the abdominal viscera.

Of *Pain in the hypochondria*, which is very common, I cannot find any satisfactory explanation. It has been referred to the liver, spleen, &c., but is probably neuralgic, and analogous to the pain under the right scapula caused by diseases of the liver.

The inferior extremity of the Spinal Cord.—A large proportion of those symptoms, in which the back, abdomen, and lower extremities are implicated, are to be referred to some morbid state of part, or whole of this portion of the cord, or attached nerves.

Aching pain and *tenderness on pressure of the loins* almost constantly affect the hysterical female. These symptoms have given rise to the idea, that the pressure affected the cord itself, or the vertebræ; and the practitioner, according to his bias, extended the patient for months on a board, as a case of "diseased spine," or leeched and blistered for "a tender and irritated state of the cord." Back-ache, however, as well as tenderness on pressing the vertebral column, is a common symptom of many diseases, totally unconnected with any particular disease of the spinal cord. The muscles of the back are, perhaps, never altogether relaxed, not even during sleep. A corpse will not remain on its side. In consequence of this continual tension, they are the first to feel fatigue when any cause debilitates the muscular system in general. Those who experienced a severe attack of the epidemic catarrh of last winter will not soon forget the intolerable pain they suffered at the time, in the loins and calves of the legs, exactly resembling the ache of great weariness. It is not at all surprising, that a debilitated female, unaccustomed to much muscular exertion, should constantly experience a pain in her back after maintaining the erect posture for a while.

Tenderness of the spinal column is very common in other diseases, as well as in hysteria. There is a man now in the hospital in whom the stethoscopic phenomena indicate organic pulmonary disease; pressure on the second or third dorsal vertebra will cause him to gasp. Dr. Marshall records a similar observation.† I have noticed

* Neuropathia, p. 41.

† Practical Obs. on Dis. of the Heart, Lungs, &c., caused by spinal irritation, 8vo. 1835.

spinal irritation in a case of diseased heart, with dyspnœa, anasarca, and coagulable urine.* Dr. Entz, a writer on irritation of the spinal marrow,† has found spinal tenderness in almost every case of dysmenorrhœa, and in most cases of menorrhagia which have occurred of late years in his practice. According to the Messrs. Griffin, spinal tenderness is an attendant on almost all hysterical complaints, and on numerous cases of functional disorder, and may arise from uterine disease, dyspepsia, worms, liver diseases, mental emotions, miasm of typhus and marshes, continued, erysipelatous, rheumatic and eruptive fevers, and pregnancy;‡ in the last, of the dorsal portion of the spine. There is no limit to statements of this kind. Taking the list given into consideration, are we warranted in saying that tenderness in any point of the spinal column is a mark of a diseased state of the corresponding portion of the spinal cord? for the doctrine of spinal irritation, stripped of its generalities, is comprised in the affirmative answer to this question.

Aware how little we know of the intimate relations and functions of vital organs, we are inclined to doubt a system of pathology presenting so easy and plausible an explanation of every irregular form of disease.

In affections commonly considered cases of spinal irritation, we sometimes have pain excited by pressing, or even touching gently any portion of the body, excepting perhaps the face. In most cases of tenderness, whether local or general, the severest pain is excited by pressure on the bony prominences. Thus the condyles of the femur will be more tender than the thick part of the thigh; and the patient will complain of the pressure as being equally painful, whether made on the spinous processes of the vertebræ or on the angles of the ribs. This I have verified repeatedly.

The median line of the trunk is occasionally more tender than any other part. In a female named Cleary, now in the hospital, under the care of Dr. Simpson, a slight touch or gentle pressure on the first or second bone of the sternum, accordingly as the patient is more or less irritable, will cause cough immediately. I have ascertained the fact beyond doubt. If such tenderness were in the median line of the back, the cord would be pronounced tender by the advocates of the doctrines of spinal irritation. The patient I allude to has three or four tender points on the posterior median line. In this state of the nervous system, the transit of a nerve through an osseous foramen, or over any part where it is exposed to pressure, gives rise to pain at the extremity of that nerve. But an inspection of the vertebral column in an anatomical subject will show at once how impossible it is to press the cord, or the nerves going from it,

* In a case of substernal aneurism, now in the hospital, under the care of Dr. Belcombe, gasping is excited by pressing on one or two of the dorsal vertebræ, or by blowing on the patient's face.

† In Rust's Magazin für die Gesammte Heilkunde, 1836.

‡ Obs. on the functional affections of the spinal cord and ganglionic nerves, by W. Griffin, M D. and D. Griffin, M.R.C.S. p. 203, 8vo., Lond. 1834.

in the slightest degree. The length of the cervical spines, and the overlapping of the dorsal, not to mention the strong ligaments and massy muscles covering the transverse processes, render the spinal cord as secure from pressure from without, as the brain.

Organic disease of the vertebræ may go on to an extraordinary extent, and also, even of the cord itself with very little or no tenderness of the vertebral column,* and but slight functional derangement of the organs in connection with the spinal chord. Velpeau has collected twenty-five cases of disorganization of the *medulla oblongata* without disturbance of the nervous functions. In some, four inches of the spinal cord was changed into a reddish fluid, so that he somewhat hastily infers the spinal marrow is not indispensable to sensation and motion.†

These considerations are advanced not to disprove the existence of that morbid state of the nervous system recently designated spinal irritation, but merely to show that tenderness of the spinal column is a sign of little value. It might farther be shown that the nervous fibrils of the tender part are in a state analogous to that of the nerves in subcutaneous tubercle, or in epilepsy accompanied with aura commencing at a diseased or irritated nerve.

This question I shall again notice. It is universally acknowledged, however, that irritation of the nerves of one organ may be communicated to those of a second, having an anatomical or functional connection. The catamenia are seldom established without aching and neuralgic pains of the back and lower extremities; partial anæsthesia, (numbness,) and tetanic contractions (cramps) of the legs. The action of the testicles on the muscles of the back in certain states is well known, causing an aching, which is merely a sense of fatigue arising from impaired power of the lumbar muscles. The transit of a calculus along the ureter will cause pain in the testicle, and a variety of sensations in the thighs. In the diseased bladder of old men there is very constantly painful heat and tenderness of the soles of the feet. Stricture of the urethra will excite numbness inside the knees; and pain in the loins, hip, down the thighs, and in the soles of the feet.‡ The introduction of a bougie will cause pain in the thigh,§ but the most curious instance of this kind is the counter-irritation, which the New Zealanders successfully practice in traumatic tetanus, by making the urethra the track of a coarse seton thread.‖ The cramps of diarrhœa, and other symptoms of a host of diseases implicating the abdominal viscera, might be mentioned, if not obvious to every one. There is scarcely a case recorded in these papers in which this principle of sympathetic irritation is not exemplified.

* Analytical review of "Travers on Constitutional Irritation," in Medico-Chirurgical Review, Vol. xxiv., p. 44.

† Archives Gen. 1825.

‡ Mr. Bingham, in Essays quoted, p. 31. § Ibidem, 278.

‖ Such I have seen stated in some recent work on New Zealand or the Sandwich Islands.

Spinal tenderness is dependent simply upon increased sensibility of the surface, and but one of many symptoms. It may indicate diseased vertebræ or spinal chord; but it has been so frequently observed in functional or organic diseases of the viscera, that it is really more indicative of the existence of the latter than the former.

This pathological connection of the spinal cord with disease of the abdominal and thoracic viscera has been noticed by Hoffmann, Boerhaave, and others, and is the foundation of the ganglionic as well as spinal pathology of hysterical, hypochondriacal, and nervous complaints.

Mr. Stanley observed paraplegia in several cases to occur without any appreciable disease of the spinal cord or its membranes; the kidneys, however, were found inflamed and suppurated; and consequently Mr. Stanley justly concludes, that the true source of the paraplegia was in the kidneys, the spinal cord being affected secondarily.* How frequently intestinal irritation will cause paralysis or convulsions is well known. I conceive that the ovaries in hysteria have a very analogous action upon the dorsal or lumbar portion of the spinal cord, either directly or indirectly through the kidneys, uterus, or large intestines.

That the ovaries can and do influence organs having an intimate anatomical or functional connection with them is most evident from the whole chain of symptoms characterizing the preceding cases, and referred to their proper heads in the subsequent analysis. At present I do not profess to explain the nature of this influence. I am content to ascertain its existence.

The reciprocal actions of the spinal nerves and abdominal viscera render the pathology and treatment of their diseases much more obscure and difficult than is generally suspected. The vigorous treatment adopted in peritonitis by most practitioners may have occasionally been directed against the tender tympanitic abdomen, constipated bowels, coated tongue, and quick pulse of a hysterical female, and the patient literally bled to death. Such instances may probably be in the recollection of the reader.

The symptoms referable to irritation of the lower spinal nerves are so obvious in the preceding cases as to require little more than enumeration.

Spasm attacking the abdominal muscles presents one form of hysterical colic, their partial contractions giving the abdomen a knotted surface. The flexors of the lower extremities are much more frequently affected than the extensors; tetanic flexion of the leg and the thigh, indeed, in varying degrees of severity, appears to be rather a common symptom. Sometimes this state becomes chronic, but frequently disappears suddenly either by metastasis or removal of the exciting cause.

Paralysis appears under a variety of forms, and may be either local or general. Sometimes the lumbar muscles are affected, and

* Medico-Chirurgical Transactions, Vol. xviii., p. 278.

the patient cannot sit upright;—or the abdominal muscles, and we have a feeling of sinking, or constipation and retention of urine. Occasionally the gastrocnemii or peronei only are affected, and the foot is distorted. Increased sensibility is very common. Tenderness of the abdomen need only be mentioned. It is the great simulator of peritonitis, but is much less rarely mistaken for that disease, since the able researches of the writers on spinal irritation. Tenderness of the back and sides is frequently mistaken for the latter complaint, as is evident from the cases published as instances of that affection. Pain and tenderness of the knee is now well known as the hysterical knee, and has been well described and distinguished by Sir B. C. Brodie. Its most usual seat is on the inside of the joint, and is probably analogous to the affection of the knee, which is symptomatic of diseased hip.

This symptom is obviously seated in the cutaneous branches of the anterior crural nerve. It has often been mistaken for white swelling of the knee-joint.

Various neuralgic pains, especially of the soles of the feet; a sensation of heat, termed by the patient flushings; partial or general formication, are all of the same class.

Partial sweats, principally on the loins and feet, are occasionally complained of.

FOURTH CLASS—THE CERVICAL REGION.

The remarks now made are equally applicable to the symptoms referable to the cervical portion of the spinal cord, and to the contiguous organs. Each of the latter are subject more particularly to increased sensibility; hence a variety of neuralgic pains referred to various parts of the head, face, neck, and breast, according as the mammæ, thyroid body, salivary glands, tonsils, and teeth are implicated. Paralysis of the muscles of the fore-arm, causing weak wrist, trismus, tetanus, and increased sensibility, local or general, of the upper extremity; partial opisthotonos, sneezing, and a variety of other symptoms, which I cannot even mention on account of the extent to which I have already carried this part of the analysis, are referable to irritation of the spinal nerves of the cervical region.

The Psychological Phenomena of hysteria having a relation to the generative functions are next to be noticed. I enter upon this part of the subject with considerable reluctance. It is difficult, from its complicated physiological and moral relations. Man is an animal, and as such, he is under the guidance of his preservative and reproductive faculties, of which, as an animal, his intellectual faculties form but a part. Revelation, however, assures us he was made in the image of God. To that Supreme Being he is responsible for his actions, and by Him, man is required to make all those animal faculties which govern brutes subservient to his high destiny,—an eternal communion with his Maker.

The faculties of the mind by which sexual congress and the other generative acts are directed alone concern us; yet it is difficult to isolate them; for the generative nisus influences the whole of the phenomena of mind.

The excited appetite for sexual gratification is as urgent as that for food under the stimulus of hunger. In both cases we find the natural ferocity and timidity of animals towards man and each other increased and diminished with a force and uniformity truly remarkable.

The desperate combats of the males, especially of gregarious animals, at the breeding seasons, is well known. Hunters and destroyers of vermin frequently make use of the generative odours as an irresistible lure of animals to their capture and destruction. By this means the housebreaker silences and tames the most ferocious house-dog. The love of offspring acts with equal force on the female. The timid hare will attack the eagle in defence of its leveret. Instances illustrative of the force of this sexual faculty might be drawn from the history of every species of animal.

These, and other mental changes consequent upon the generative impulse, do not take place simultaneously. The war among the males of gregarious animals terminates with the business of conception, and before the birth of the young. At this time, the female, so far from being bold and quarrelsome, is most timid and cautious.

Indeed one of the most remarkable of the faculties, and peculiar to the females of the higher classes of animals, is their artfulness or dissimulation; and seems to be given in place of those weapons of offence and defence with which the males are so generally provided.

The less muscular power, want of defensive weapons, and exalted perceptive faculties* of females would naturally engender a degree of timidity and cunning. Consequently, these attributes have been considered, and with truth, as essentially a part of the feminine constitution. Cabanis, after numerous interesting remarks on the mental and corporeal constitution of the human male and female, emphatically concludes, "Il faut que l'homme soit fort, audacieux, entreprenant; qui la femme soit faible, timide, dissimulée."†

These observations must be strictly confined to woman considered as a mere animal, and seeking, in common with brutes, the maintenance of her existence, and the gratification of her sensual pleasures. These objects of her being are distinct from the (perhaps) more

* "Vainement l'art du monde couvre-t-il et les individus, et leurs passions, de son voile uniforme: la sagacitè de la femme y démêle facilement chaque trait et chaque nuance.—S'il est permis de parler ainsi, son œil entend toutes les paroles, son oreille voit tous les mouvements; et, par le comble de l'art, elle sait presque toujours faire disparaître cette continuelle observation sous l'apparence de l'étourderie ou d'un timide embarras." Rapport du Physique, &c., de l'Homme. tome i., p. 305, 3me ed.

† Op. cit., p. 294.

important object, the reproduction of the species. So soon as the organs subservient to the latter are developed, the peculiarly feminine qualities above-mentioned, acquire a remarkable exaltation, as indicated by the secrecy and dissimulation practised by women in the performance of certain offices of life, and which, in her, are both required and excused.

When the generative organs of the female are in the full performance of their functions, this artfulness is still more exalted, and in brutes practised so as to rival the highest attempts of human sagacity. The skill they display in the choice of a secret place in which to deposite their eggs or young, and the finesse with which they protect the latter from discovery and injury, must be well know to the student of natural history. Even the most ferocious female animal does not disdain to practice the most consummate cunning. The lioness, when she fears to have her retreat discovered, will hide her foot-traces by retracing the ground, or by brushing them out with her tail.

The perversion of some of these peculiarities of the female, form the most prominent physiological phenomena of hysteria and puerperal mania.

Extreme timidity is usually the consequence of a fright. (Case 64.) *Sudden impulses to do a bodily injury*, a symptom of hysteria, is perhaps the converse. The strangest perversion of all is that which impels a mother to destroy her infant,—a state of mental alienation which occasionally attacks brutes. Sows will destroy their own offspring; and I have seen a cat eat her kittens.

Hysterical imposition is a symptom which has caused the greatest speculation and astonishment. Of all animals, an artful woman is the most artful, and when we consider how this faculty may be exalted by the influence of the generative organs, there is not much real ground for surprise at the grotesque forms which it sometimes assumes in the hysterical female.

Whatever may be the cause of this propensity to deceive, it is as certainly a symptom of hysteria as any corporeal symptom whatever. It is as true a monomania as the infanticidal, and is most likely to occur in the female who is hysterical from excess of sexual development; one, possessing the utmost modesty of deportment and grace of figure and movement;—for the modesty itself springs out of the feminine timidity to which I have alluded.

The strange deceptions practised during this state of the mind, by the most respectable and amiable females, have thrown a doubt over their statements, and induced the observer to conclude, that all their symptoms were feigned, and this the more readily, because the deceptions attempted have had a reference in general to those organs, the functions of which were deranged. But this is precisely analogous to what takes place in insanity; the illusions of the insane being, according to Esquirol,* connected with some special function or organic lesion, just as the hysterical maniac,

* In a memoir read at the Institute in October 1832.

feeling the dyspnœa from laryngeal spasm, asserts a demon is strangling her. A hysterical young female has really a marvellously small appetite, and, to increase the wonder, refuses all food whatever by day, and pays secret visits to the pantry by night. She has retention or partial suppression of urine, and so she crams the vagina with stones, and drops them into the chamber-pot, to make people believe she has stone in the bladder. In all other respects she conducts herself with the most unaffected modesty and propriety. Some cases recently recorded of lizards being discharged from the alimentary canal are of this character. A young woman had nausea, profuse flow of saliva, and a sensation which she described as if some living body attempted to rise up her throat, and then fell down into the stomach. An emetic was prescribed, and (as might be expected from her sensations) the patient vomited a living lizard!* Baglivi states of the hysterical and lascivious females, especially the nuns of his day, that they would simulate tarantism for the pleasure of dancing, and that this practice was called "il carnevalleto delle donne."† There is a curious case recorded in the seventh volume of the Edinb. Med. and Surg. Journal. A female in this hospital, under the care of Mr. Champney, thrust pins into her mamma. Dr. Elliotson had a hysterical female who feigned hemorrhage.‡ The remarks of Dr. Seymour on this subject are the best I have read.§

This propensity is unfortunate, as it renders the symptomatology of hysteria still more difficult.

We must endeavour to avoid the equally injurious extremes of unlimited faith and absolute incredulity. The imposition itself may be useful in directing our attention to the state of the organ implicated in it, as most probably either its functions or structure will be deranged. We ought also to remember, that the propensity is a part of the disease, and its indulgence will be attempted; perhaps the best way to treat it is quietly to permit the patient to deceive us, and make its gratification subservient to the remedial treatment.

Anorexia, *Bulimia*, *Pica*, and *strange longings*, are characteristic of the pregnant, chlorotic, and hysterical female, and have their origin from the same common source, but forming perhaps a third or fourth link in the chain of effects. I had collected a few illustrative facts, but they would be quite inconclusive without some discursive explanations. I would merely say that the dislike of animal food is almost pathognomonic. My paper, I fear, is already too long. I must therefore close, at this point, the first part of the analysis, and, should it be received favourably, I propose considering the remaining portions in a future Number.[a]

I have only to add, that I do not consider myself bound to main-

* From a German periodical in Med. Chir. Rev., Vol. xxvii., p. 541.

† De Tarantismo, cap. vii.

‡ Clinical Lectures in London Medical Gazette, Vol. vii.; p. 239.

§ Obs. on the Medical Treatment of Insanity, p. 23, 8vo., 1832.

[a] [The essay of Dr. Laycock appeared in the *Ed. Med. and Surg. Jour.*, from which it has been taken and divided into chapters for the Library.—Editor.]

tain any opinions I have advanced in this paper, if, in prosecuting the analysis, a more extended induction shall prove them erroneous, or involve them in more general principles. All I wish to do is, to arrange and generalize facts, and draw conclusions which may serve as a basis for a more extended synthetical analysis, and lead to a better diagnosis and treatment of these diseases.

There are some obscure diseases of females which might, perhaps, be better understood if observed with a special reference to the plan I have adopted. I have experienced its utility when examining a patient, and have elicited a variety of minute particulars altogether overlooked by the patient herself. Diseases of females, or even of males, named after some principal symptom, originating in the pharynx or larynx, are of this class, as hydrophobia, hooping-cough, bronchitis, and analogous affections, really hysterical. The idiopathic wry-neck (*torticollis*) affects young females, I believe, almost exclusively. I am sorry I have lost one or two opportunities of investigating its nature, but I suspect it to be of the same character as hysterical trismus, and that it ought to be classed with the local hysterical affections of Sir B. Brodie. Numerous analogous diseases might be mentioned as worthy of the method of investigation to which I have alluded.

We might also be led to know, why one structure is affected rather than another; the left rather than the right: the thyroid body, rather than the mammæ; the larynx rather than the fauces; and so on with the other organs connected directly or indirectly with the ovaries.

CHAPTER IV.

Laws of female development—Condition of sex influences the vascular system—Changes of the blood accompany the more aggravated forms of hysteria—Effects of hemorrhages and remedial bleedings in exciting and aggravating hysteria—Chlorosis does not dispose to hysteria—Phenomena of hysteria in relation to the nervous system.—Resemblance between the affectibility of females and that of children—Inferences respecting dentition—Influence of mental emotions—Effects of blood-letting—Effects of poisons—Phenomena of certain diseases of the Nervous System—spasmodic asthma—angina pectoris—tetanic spasms—Effects of certain poisons—hydrophobia—tarantism—cantharides—Vegetable poisons—Epilepsy—Neuralgia—Paralysis—Lateral curvature—Amaurosis—Anæsthesia—Review of some anomalous phenomena—Catalepsy—Endemic chorea—Imitated movements, &c.

In the two first chapters of this essay, I gave a selection of cases, comprising, with one or two unimportant exceptions, every form of those diseases usually called hysterical, with a view to an inquiry into their nature and causes. In chapter second, I commenced an inducive analysis of their phenomena, by establishing three general principles as applicable to every case. These were, 1. That the nervous system is principally implicated in these affections; 2. That it is, with certain exceptions, the nervous system of females only

which is so implicated; and, 3. That these affections are observed only in females, at a time when the sexual organs are performing their peculiar functions. Commencing with the third or least general head, I attempted a synthetical arrangement of the symptoms, in connection with the organs of generation and their functions. It would be observed, that I was obliged in my former paper to anticipate various remarks which ought to have been made under the second head. These I shall not repeat here, but merely state the conclusion at which I arrived, namely, that the well-known susceptibility of the female, and her peculiarities of corporeal organization, do not depend solely upon the generative organs, but originate in some higher law of development, which involve the latter organs in common with the whole system.

By universal consent, the nervous system of the female is allowed to be sooner affected by all stimuli, whether corporeal or mental, than that of the male. As this state of the system is the source of the weaknesses, so also it is the origin of all the physical and psychical beauties of the female. If we search for a clue of inquiry into its nature among the laws of development, we shall find nothing sufficiently tangible or certain for the purpose. Pathology, however, in the hemorrhagic diathesis of the hysterical, points out an available starting point in the vascular system. In all females during the menstrual nisus, when there is an exalted affectibility of the whole system through the influence of the ovaries, we find the blood-vessels of the uterus to assume a state analogous to that of the vascular system in hemorrhagic hysteria, and to pour out the colouring matter of the blood, together with the proper uterine secretion. So that the menstrual secretion may be considered as the type of hysterical hemorrhage. The monthly flow of blood from the urethra and rectum of some males is probably somewhat analogous. These cases do not appear very uncommon, and clearly indicate a periodical movement in the structures connected with the lumbo-sacral portion of the cord in the male.

But the law of development to which I referred has some influence on the anatomical and vital constitution of the whole vascular system in both men and women. This is clearly shown by that curious form of disease in which there is a hemorrhagic diathesis, which is hereditary in certain families, and peculiar to the males. From instances recorded by various writers in various parts of the world, it appears that the individuals having this hemorrhagic constitution may bleed to death from the slightest solutions of continuity, as the puncture of a pin, or of the vaccinating lancet, or any trifling injury of the surface; and that the females of those families in which it is observed are (with two exceptions mentioned by Dr. Elsässer*) invariably exempt. Their male offspring, however, will certainly possess the fatal diathesis, while their female children, like themselves, will escape.

* Hufeland's Journal, February and September, 1824. In these exceptions there was a tendency to ecchymosis during youth only.

With these facts before us, it is impossible to avoid the conclusion, that the same condition of the system which determines the sex of the embryo, determines also the hemorrhagic constitution of the male, and prevents its development in the female; and, also, as a corollary, that the condition which determines the sex, influence in some way unknown the vascular system. It does not appear that there is any resemblance between the accompanying phenomena of the hemorrhage of these individuals and those of the hysterical. They agree only in the leading symptoms, and in this, that both kinds may be classed under two heads, as they present the phenomena of purpura, or an increased activity of the vascular system.*

The organs from which the hemorrhages in hysteria occur, suffer with a frequency corresponding to the intimacy of their connection with the ovaries. Hemorrhage from the uterus is the most frequent of all; next from parts about the larynx and fauces; then most frequently (in the order in which they are mentioned) from the mammæ, ears, stomach, lachrymal gland, surface of the neck, ulcers, especially of the legs, kidneys, intestines, surface of the extremities, especially of the hands and feet; and lastly, from the epigastrium. These hemorrhages must be distinguished from vicarious menstruation; although they certainly occur most frequently at the menstrual period, as *à priori* might be expected. Vicarious menstruation occurs also from organs in the order abovementioned. Of 29 well-marked cases I have collected, it occurred in 7 from the eyelids or eyes; in 1 from the eyes and ears; in 1 from the nose; in 6 from the mammæ; from the skin and upper extremities in 5; from the stomach in 3; from the umbilicus in 2; from the rectum in 2; and from the feet in 5 cases.

The ratio in which the various constituents of the blood enter into its composition is worthy of notice, as having an intimate relation with the affectibility, natural or morbid, which I have mentioned as peculiar to the female. In a great proportion of the cases of hemorrhagic hysteria, the blood had a loose crasis, arising apparently from a deficiency of fibrin. And in those cases in which this particular phenomenon is not mentioned, we may very fairly infer from the details that the blood had this defect. Blood-

* Those who may wish to investigate this curious subject will find the following list of references to cases and monographs more complete than any yet given. Edin. Med. and Surg. Journal, xix., xxv., xxvi., xxxii., xxxvi.—Lond. Med. and Phys. Journal, xx., xl., lx.—New Lond. Med. and Phys. Journal, vii.—Dublin Journal of Medical Science, vii.; and Mr. Wardrop's work on Blood-letting.—Horn's Arch. für Medicin Erfahr. 1820, Vol. i. contains a paper by Nasse, with bibliographical references, which may be found in Vol. xxv. of Edin. Med. and Surg. Journal. To these may be added, Rust's Magazin, xxvii. B. ii. 1828.—Zeitschrift fur Nat. und Heilk. v. B. ii.—Archiv. Gén. de Med. Ser. ii. Tom. xiv., and Ser. iii. Tom. i., 1838.—Suisse Gaz. Med. 1838, No. iii.—Ripp. Untersuchungen in Betreff. der Anlagen zu todtl. blutungen, Frankfurt, 1835.—Schonlein, Allgemeinen und Specielle Pathol. und Therapie, Vol. ii.—Nachricht von Zwei Blutern Mitgetheilt, von Doctor Schreyer, zu Vegtsberg un Sachs. Vogtlande.

letting will of itself produce this condition. Provost and Dumas having bled a cat largely, found 1000 parts of its blood to consist of 791 of water, 87 of albumen, and 118 of globules. Two minutes afterwards they repeated the bleeding, and found the water increased, and the solid particles diminished in quantity, and after an interval of five minutes, the bleeding was repeated for the third time, and they found the blood to consist of 829 parts of water, 93 of solid particles, and 77 of albumen. M. Le Canu obtained similar results from the analysis of human blood taken from patients who had been bled to a large amount, or were labouring under hemorrhagic affections.* These experiments are important when connected with the pathological phenomena of hysteria and of excessive depletion. It is not a little curious in connection with this subject, according to Le Canu, who made an extraordinary number of observations, the blood of women in general contains more water and less crassamentum than that of men. Le Canu found the quantity of water in 1000 parts of the blood of females to vary from 790,394 to 853; of males from 778,625 to 805,26.† Denis examined the blood of 24 men and 28 women; and the mean result of his experiments was, that the proportion of water in the blood of males and females is as 767 to 787. He found also a greater proportion of water in the blood of aged persons and children.‡ According to Le Canu, the blood of men contains in 1000 parts, about 3298 more of the components of the crassamentum than that of women. In the blood of the latter during menstruation, he found the blood to contain less clot.§ If these observations were extended so as to comprise an analysis of the blood of females constantly exposed to the open air, and in robust health, with the same results, they would go far towards elucidating some obscure points in the characteristics of the sexes. At present, however, we can only infer that the blood of females living in towns (for such I presume was the subject of Le Canu's researches) presents these peculiarities, and that the blood of females in general is more easily affected by the depressing agencies experienced in crowded societies.

But even in this limited view of the subject, the connection between the affectibility of the females, and deficiency of crassamentum or fibrin in the blood, is farther illustrated by the exceptions to one of the general principles I laid down at the commencement of this analysis, namely, that hysterical affections are peculiar to females. Hysteria most unquestionably occurs in the male. Louyer-Villermay,‖ and those authors who locate the disease in the uterus, necessarily deny this, for as young men have no uterus, they cannot possibly, according to their theory, have true hysteria.

* Cyclopædia of Anatomy and Physiology, i., 413.

† Müller's Physiology by Baly, p. 119. ‡ Ibid.

§ Ibid. The whole of M. Le Canu's researches may be found in "Etudes chimiques sur le Sang humain. Thèse présentée et soutenue à la Faculté de Médecine de Paris, le 23 Nov. 1837, par Louis-Rene Le Canu, 4to, Paris, 1837.

‖ Dict. des Sc. Med. Tom. xxiii., p. 230.

The affirmative is asserted, however, by many observers. Piso, Willis, Sydenham, Boerhaave, Cullen, Ferriar, Mackintosh, Johnson (of the Med. Chir. Review), Conolly, Brodie, M. Hall, and many others have observed hysteria in males.* I think I have seen three cases in the hospital, the symptoms of which, if they had been observed in females, would certainly have entitled their history to a place in my collection. The first was that of a small delicate youth, aged 14. He had paroxysms of violent palpitation and dyspnœa occurring regularly every night for two or three weeks together. To these were occasionally added spectral illusions, delirium amounting sometimes to furious mania, cephalæa, diminished secretion of urine, pain in the loins, constipation, and particularly, as an almost diagnostic symptom,—an unconquerable dislike of animal food, especially of beef or mutton, the smallest portion of which would make him vomit. He recovered as he approached puberty.† The other two cases were those of fat, pale-faced, effeminate-looking men. In the one, the affection was attributed to malaria, and he had flabby wasted testicles, with very scanty secretion of urine, globus, borborygmi, colic, and paralytic affection of the arm.

Epileptiform hysteria and epilepsy not unfrequently occur in the male at hebdomadal periods, or multiples of them, just as lunacy. These and the other varied forms of hysteria may occur in males from various causes, such as a feminine general system; depletion about puberty; malaria; in short, from any of the causes which engender or increase the affectibility of the human female. But the most fruitful sources, of hysteria and hypochondriasis are those agents which act injuriously on the blood, as well as on the nervous system. Diseases of mucous membranes, want of muscular exercise and due exposure to the atmosphere; improper food; vicious habits implicating the generative organs and debilitating the system; and excitement of the brain and nervous system in general, however originating. These causes of hysteria are referred to by every writer on the subject. All operate, probably, by reducing the blood to a state very similar to that of the hysterical female. Analogous to the effects of these, are the changes produced on the blood during spasmodic diseases, as tetanus and epileptic convulsions; by certain mineral poisons, as arsenic; by animal poisons, as in rabies and the bites of venomous reptiles, and by acro-narcotic vegetable poisons, as opium, strychnine, brucia, &c.; and we shall subsequently find how great is the resemblance of the pheno-

* Cases may be found under the following references: Edin. Essays and Obs. i. 222. Ferriar, Med. Hist. and Reflect. i. 128. Edin. Med. and Surg. Jour. ii. 303. Med. Chir. Review, New Series, vii. 412, xviii. 207, (from Revue Med. 1832,) and xxiii. 63, all well-marked cases. Dr. Conolly, Cycl. of Pract. Med. ii. 565, Dr. Robertson, Med. Gaz. xv. 460. Dr. Crawford, suffered in his own person a paroxysm of epileptiform hysteria, Cyc. Pract. Med. i. 469. Other cases are mentioned by most systematic writers.

† I learn that he has had a relapse since he entered a shop at Leeds as an apprentice.

mena of hysteria to the symptoms which these poisons excite in the system.

Without, however, anticipating the last-mentioned class of facts, we may conclude, from the preceding general observations, that a loose crasis of the blood, a deficient clot, or some other morbid change, is concurrent with the affectibility of the human female, and almost invariably accompanies the more aggravated forms of hysteria; and this conclusion is strengthened by the following general facts drawn from the whole series of cases.

1. Profuse hemorrhages, or other depressing accidents occurring to the female about puberty, usually excite the most obstinate forms of hysteria.

2. Repeated remedial bleedings, whether by leeches or from the arm, however much they may relieve the symptoms at the moment, ultimately induce the same form of the affection as profuse hemorrhage.

3. Profuse hemorrhages and remedial bleedings will of themselves induce hemorrhagic hysteria; the most aggravated form of the disease.

4. Moderate exercise in the open air, good plain food, and tonics; in short, all those remedial agents which tend to restore the blood to its healthy condition are the best remedies.

I think every practitioner who has witnessed cases of this kind will acknowledge at once the justness of these conclusions. If they be just, I think no one will venture to take blood from the pale, delicately-tinted, finely-formed female, without considering that the corpulence may be hysterical; the excited pulse, intense cephalæa, and sanguineous sputa are the symptoms of exhaustion; the torpid bladder and bowels, only symptoms of paralysis; and the greatly exalted sensibility of every organ, the result of debility. One bleeding of a highly hysterical female will not be repaired in weeks, and will perhaps induce months of suffering.

I would not have ventured upon these remarks, had not my own short experience painfully convinced me how easy it is to do with the lancet that harm, which prolonged anxious attention will scarcely repair. I have, therefore, resolved to err on the safe side, and not to bleed a female such as I have described, however much the symptoms may resemble those of inflammation, unless there be some cause so palpably obvious as to leave no doubt whatever of the nature of the case.

Before dismissing this part of the inquiry, I would remark, that so far as I have observed, chlorotic or anæmious females are rarely hysterical. It must be observed, however, that in these there is little evidence of sexual development. The individual grows rapidly, but there is scarcely any action in the skin; the mammæ are seldom raised more than inch above the surrounding parts; and there is no embonpoint, nor uterine secretion. When the generative organs are well-developed, and the blood contains a diminished quantity of colouring matter, we may expect hysteria

to appear with great confidence. But it must not be forgotten that there are females whose blood apparently contains an abundance, and who have a vigorous sexual system, but suffer very usually from the common forms of the disease. It is in such that every venesection produces some new or more intense symptom, until the depletion being carried beyond a certain point, the surface assumes a waxy paleness, and coma or catalepsy supervene. It is not improbable, that, in instances of this description, the congested hue of the surface, especially of the face, from which it is inferred that colouring matter abounds, may be only a symptom of that determination to the skin which obviously occurs in many cases of hysteria.

There is some obscure connection between the functions of the spleen, and the amount of colouring matter in the blood. Pain in the left hypochondrium is a frequent symptom in chlorosis and hysteria. Extreme paleness of the surface is almost diagnostic of disease of the spleen; and the same appearance constantly accompanies the enlarged spleen consequent upon agues. Müller thinks the spleen contributes to the process of sanguification, by secreting lymph of a peculiar nature, the office of which is to perfect the formation of chyle.* M. Arthaud imagined that he could show by experiment, and by facts from comparative anatomy, that the spleen is nothing more than an electric apparatus, by the agency of which the blood undergoes some modification.† M. Strauz, from some microscopical observations upon the texture of the spleen of the elephant, concluded it was a plexus dependent upon the ganglionic system of nerves.‡ Again, those substances which especially stimulate the nervous system, and to which I have already alluded as altering the composition of the blood, act particularly upon the spleen Arthaud asserts it is always tumefied by their presence;§ but, Defermon says, it becomes smaller under the influence of camphor, strychnia, and muriate of morphia.‖ The most interesting fact, if verified, is that stated by Arthaud, who states that in true acephalous cases, the disappearance of the spleen is a constant occurrence.¶ In short, it appears that the spleen is influenced by the state of the blood, and by the nervous system.

In concluding these very general remarks on the affectibility of the human female, I would observe that I do not wish to be understood as advocating the doctrine, that it is the natural state; although I believe it is. It may result equally as the condition of the blood before noticed, from the sedentary occupations and repressed feelings to which the sex in all civilized communities is liable. I simply contend for its existence; it may be compatible with general good health in females: but in males it is a morbid state; the source of hypochondriasis, and the result of causes which depress the assimilating powers, or excite unequally the nervous system. Those causes which originate it in the male, will exalt it

* Physiology by Baly, p. 571.
† Jour. der Progres, 1827. London Medical Gazette, i. 454. ‡ Ibid.
§ Loc. cit. ‖ Nouveau Biblioth. Med. Mars 1824. ¶ Loco citato.

in the female; and we have then the morbid sensibility which forms so prominent a symptom in every case. The great demand made at puberty upon the assimilating organs to which the supply is unequal, and the rapid evolution of the nervous system, whether as subservient to the function of generation or to mind, are manifestly agencies of a depressing character. At that period, the influence of the sexual system is unquestionably predominant; and hence the symptoms enumerated in the first part of the analysis.

The third section of the analysis comprises a consideration of the phenomena of hysteria in their relation to those of the nervous system in general. It cannot be expected that I shall enter minutely into the details of so extensive a field of inquiry. I shall therefore select the more prominent points only in the anatomy, physiology, and pathology of the nervous system, as means of illustration, and rather sketch general outlines, than draw a finished picture. The whole of the phenomena are naturally divided into two great divisions, as they are mental or corporeal. I shall commence with the latter as being least complicated. The plan I intend to follow is very simple. I shall mark it out with reference to the previous sections; so arranging the subject, that, by a higher induction, we may be led to some more definite knowledge respecting the true nature and seat of these affections, but avoiding as much as possible all controverted points.

We must, consequently, review the whole of our previous steps, and deduce some general principles which may serve as the basis of a new synthetical arrangement, and comprehend the two divisions over which we have already passed. First, then, while we learn from the series of cases that the whole nervous system is affected, we find from the first section, that that part of the nervous system subservient to the functions of generation is more especially implicated, and, pushing our inquiry a little farther, we ascertain that, with certain exceptions, as the skin, the nerves of the organs affected have a close anatomical relation with the superior and inferior extremities of the spinal cord. By the superior extremity I mean that intra-cranial portion of the spinal cord, the *medulla oblongata* and its prolongations, from which all the intra-cranial nerves arise; by the inferior extremity I mean that part in connection with the genito-urinary organs; the large intestines to their termination; and the abdominal muscles and lower extremities. The motor nerves of the eyes, face, and neck,—the stomach and thoracic viscera and their appendages,—indeed, all the parts supplied by the class of nerves termed respiratory, are necessarily in connection with the *medulla oblongata.* This division of the symptoms, as they refer to parts in anatomical relation with the two ends of the spinal cord, is by no means new or fanciful. It is simply a higher generalization, and nothing more than the removal of the seat of the φρην of the ancients, (the *archæus* of Van Helmont,) from the epigastric region to the *medulla oblongata;* and of the seat of the θυμος, or principle

of vegetable life, from the abdominal viscera to the dorso-lumbar portion of the cord. The third or highest principle of the ancients, the νους or soul, is left in undisturbed possession of the cerebrum, where it was located by philosophers about 3000 years ago. This principle, upon which I propose to group the phenomena about to be noticed, has other claims to notice than its logical utility. The metastasis, to which I have more than once alluded, is particularly obvious, when the phenomena of a case of aggravated hysteria are thus grouped. Those implicating the pelvic viscera will occasionally disappear, and vomiting, dyspnœa, cough, palpitation, and cephalæa supervene; to disappear in their turn at the menstrual, or an hebdomadal period, with a completeness altogether surprising; and be succeeded by menorrhagia, diarrhœa, ischuria, constipation, vesical paralysis, and neuralgic pains of the abdomen and lower extremities, or some other of the symptoms before-mentioned. I have recently observed this metastasis so clearly and unequivocally in two cases that I cannot doubt other practitioners will notice it also if they direct their attention to the phenomena as thus grouped. Independently of this pathological relation of the two extremities of the spinal cord, there is a law of sexual development in which they exhibit apparently a kind of antagonism. The greater size of the neck and thorax not only in man, but the males of other animals, as the bull, boar, stag, and dog, and their comparatively small lumbar region, while exactly the converse occurs in females, as well as other analogous changes in the tegumentary appendages, namely, the beard, mane, tusks, horns, and feathers, deserve especial attention. They all illustrate this principle, and it will be further elucidated as I proceed.* The synthetical principle which may be deduced from the second section is, that the composition of the blood is altered in hysterical affections; and since these latter resemble the convulsive and other affections of the nervous system in general, it may be added as a corollary, that in these last there is a morbid condition of the blood also. This corollary, however, is principally applicable to those convulsive diseases which are excited by the presence of poisons in the circulating fluid.

Having premised these general considerations, I shall merely state the order in which I shall proceed. 1. The resemblance between the state of the blood and condition of the nervous system of females and children induces me to review infantile diseases in general. 2. The frequency with which mental emotions

* Since writing the above, I have met with the following remark by Cabanis. "Dans son traité du corps muqueux, Bordeu rappelant la doctrine des anciens, touchant les deux grandes divisions du corps de l'homme, en gauche et droite d'une parte; et en supérieure et inférieure de l'autre; doctrine que la pratique de la médecine confirme chaque jour, mais qui les mécaniciens modernes rejetaient, parcequ'elle ne paraissait pas appuyée sur l'anatomie: Borden, dis-je, a fait voir que les grandes distributions du tissu cellulaire se rapportent, en plusieurs points, à cette division qu'avait fournis aux anciens la simple observation des phenomènes vitaux," &c. Rapports du Phys. &c. ii. 411. I am unacquainted with the ancient authors referred to by Bordeu.

give rise to hysteria, and their well-known action on the blood, require that their general effects on the system should be noticed. 3. Review the consequences of blood-letting. 4. The results of poisoning, so far as they bear upon our subject. 5. The symptoms of those nervous diseases which have a similar relation; and 6. The phenomena of some anomalous affections.

From this arrangement I shall occasionally deviate, when by so doing I can economise space, or more clearly elucidate the subject.

It is universally acknowledged that the affectibility of the female sex has its counterpart in that of children. This is proved by that facile excitement of mental emotions and convulsive movements which is common to both. That this excitability is not dependent upon the *cerebrum* would appear from the fact, that in early infancy, when the proneness to convulsive movements is best marked, we observe only the simplest mental phenomena, and those only which are common to the lower animals. That, previously to puberty, the cerebrum is in a condition differing from that which is observed after puberty, is further evident from the impulse given to the intellectual organs on the accession of that period. The difference is still more obvious, when we consider the effects of injuries done to the brain before and after it. While these are among the most fatal accidents which can happen to the adult, in children their consequences are not more serious than those which would follow an injury of corresponding severity done to any other part of the body. This circumstance cannot have altogether escaped the notice of systematic writers. Sir B. Brodie, however, is the only one I have met with who makes any allusion to it. He remarks,* that the proportion of recoveries from wounds of the brain is especially small in adult patients. I have noticed the fact repeatedly. For better satisfaction, I collected from various publications,† 81 cases of injury of the brain, with a special reference to the proportion of recoveries at various ages. The following is the result:

	Whole number.	Recovered.	Died.
Patients under 10 years of age, -	8	6	2
Do. between the ages of 10 and 16 inclusive,	24	18	6
Do. between 16 and 21 inclusive, -	8	7	1
Adults of all ages above 21 years, - -	41	14	27
Total,	81	45	36

I have no doubt this table will be in accordance with the observations of every experienced practitioner. These various circumstances tend to show, that in children the feelings and passions

* Medico-Chirurgical Transactions, xiv. 417.

† Medico-Chirurgical Transactions; Medical Commentaries; Annals of Medicine, and Edinburgh Medical and Surgical Journal; Medico-Chirurgical Review; Abernethy's Surgical Observations on Injuries of the Head, &c. 2d edition; London, 1815. Sir A. Cooper's Lectures by Tyrrell, 3d vol. 8vo. 1824–7. Vol. i.; Sir C. Bell's Surgical Observations, 2 vols. 8vo, Vol. ii. and personal observations.

are not dependent on the full action of the *cerebrum*. The sphere of investigation might be much extended, by including an inquiry into the relations of the passions to the *cerebrum* in idiots and the lower animals. If we examine the convulsive diseases of children, the earliest is trismus, occurring generally within the first nine days after birth. The history is very scanty; I shall therefore pass it over. The next series of convulsions are those accompanying the evolution of the teeth,—organs in connection with the cranial end of the cord. The proximate cause of these convulsions has been attributed to irritation or compression* of the dental branches of the fifth nerve, by the walls of the unyielding bony socket of the teeth during the growth of the latter. Some change must also occur in the central ends of the nerves, by virtue of which the process of dentition is commenced and carried on. The latter, as a part of the evolution of the whole system, is well calculated to form a starting point, because it represents with tolerable accuracy the progressive evolution of the mucous, muscular, osseous, and nervous systems, which are all equally advancing to perfection. If the general development be retarded, dentition is also retarded; if the latter be anormal, then the other structures are affected, and rickets, infantile paralysis, or hydrocephalus ensue. So that painful or irregular dentition may be much oftener an effect coexistent with convulsions, rather than their cause.

The same reasons which would lead us to exclude from this review of the diseases of dentition, the *cerebrum*, and consequently all those symptoms in which intelligence is implicated, must induce us, also, to look for no symptoms specially involving the generative organs; for as yet they exert no perceptible influence on the system. Excluding these two sources, then, of excitement and of the phenomena referred to them, we have symptoms exactly similar to many of hysteria, and indicating, that during dentition, there is a state of the nervous system analogous to that which occurs to females at the commencement of menstruation, and, in a less degree, during each subsequent menstrual nisus. The diseases of the first dentition, then, must be examined, as if they constituted but one, just as we have already examined the symptoms of hysteria with reference to the generative organs. Those usually enumerated by systematic writers† may be mentioned, and classed as follows: 1. Those originating in organs connected with the upper extremity of the spinal cord. *a.* Symptoms originating in the cerebro-spinal centre, coma, watching, and sudden starting from sleep; increased sensibility of the surface;‡ general and epileptic convulsions; opisthotonos, paralysis. *b.* Symptoms implicating the face; strabismus,

*Sauvages' Nosol. Tom. i. 572.

† More particularly in a Treatise on Diseases of Children, by the late M. Underwood, M.D. 9th edition, with notes, by H. Hall, M.D. 1835; and an Essay on *Laryngismus Stridulus*, &c., by H. Ley, M.D., 8vo., London, 1836.

‡ Cruveilhier and Parrish, quoted by Mr. Joy in Cyc. Pract. Med. Art. Dentition, Vol. i. 521.

fixed stare, sardonic grin, trismus, convulsive twitchings. *c.* Symptoms referred to the larynx, trachea, and *bronchi*;—aphonia, convulsive cough, hydrophobic grasp,* spasmodic closure of the glottis, croupy breathing, wheezing from increased or diminished secretion from the *bronchi*. *d.* Symptoms affecting the Pharynx, œsophagus, and stomach;—retching, vomiting, dysphagia,† eructation, impaired appetite. *e.* Symptoms affecting the Heart; palpitation,‡ syncope. *f.* Symptoms affecting the Respiratory muscles; dyspnœa, sneezing, hiccup, yawning. 2. Symptoms implicating the dorso-lumbar cord. Paralysis and tetanic extension and flexion of the lower extremities, serous exudation from the buttocks,§ increased micturition,‖ ischuria, mucous discharges from the urethra, dysuria, constipation, diarrhœa, colic, tympanitic distension.

Systematic writers in general agree in making one or other of these symptoms the cause of the rest; the less severe having the blame of inducing the more serious. Thus the protrusion of a tooth through the gums, constipated bowels, or flatus, have had the whole catalogue attributed to their injurious influence. That they are exciting causes, may be readily granted; but if dentition necessarily caused such formidable effects, why do they not occur in every infant? or at the second evolution of the teeth? or when the *dentes sapientiæ* appear? It is true that a constipated state of the bowels will excite convulsions in infants;—but why more readily in infants than in adults? during the cutting of a tooth than in the interval? or why, indeed, is there constipation at all? The true explanation is, that this state is itself a symptom amongst others, and is frequently premonitory of approaching disease of the nervous axis; if neglected, it then re-acts secondarily as a cause. So also dyspnœa and depraved defæcation do not hold to each other the relation of cause and effect, but are simply co-existent. There is clearly some peculiar state of the nervous system of the infant during dentition; and if we separate one of these symptoms from the rest, we shall find a still more distinct resemblance between its predisposing cause and that of hysteria. The spasmodic or paralytic affection of the glottis, named *laryngismus stridulus* by Dr. Good, and so elaborately illustrated by the late Dr. Ley, will furnish an excellent example. *Laryngismus stridulus*, like hysteria, may be accompanied by most of the symptoms just enumerated; like the latter, also, it may be caused or cured by mental emotion, as fright or grief; by all depressing agencies; or by dental and other irritation. It equally constantly with hysteria attacks delicate, excitable habits; the exceptions of both being similar. Its paroxysms recur most frequently at night; it is hereditary,¶ and like the other dis-

* Dr. Ley, Essay on *Laryngismus Stridulus*, &c. p. 36.

† Mr. Kerr on *Laryngismus Stridulus*, Edin. Med. and Surg. Journal, xlix. p. 345.

‡ Dr. Darwell on the Management of Infants, p. 141, 12mo. 1830.

§ Mr. Kerr, loc. cit.

‖ Underwood, quoting Moreton in op. cit. 394, also Whytt's Works, 4to., ed. by his Son, p. 597.

¶ Ley, North, Davies, Pretty.

eases of dentition and of the hysterical, is cured by change of air, moderate exercise, tonics, and the fœtid and volatile stimulants.* Laryngismus appears in children during dentition for the same reason that it appears in hysteria, namely, because there is a state of the system predisposing to the disease. It not unfrequently occurs in children independently of dentition.

The effects of dentition upon females after puberty, in exciting the phenomena of convulsive diseases, have been clearly elucidated by Dr. Ashburner.† In such cases there is manifestly that predisposing state of the system, through which excitants, otherwise innocuous, originate an extensive series of morbid phenomena; and they afford another proof of the proposition, that the system of the child is more excitable during dentition, but especially at the periods when the teeth protrude, just as is that of the female during the evolution of the generative organs, and at each menstrual nisus. The child evinces this excitability in the interval between the "cutting" of each tooth, by the convulsions which morbid poisons (as that of *variola*) excite, and by other phenomena.

The facility with which irritation of the mucous surfaces excites the various symptoms enumerated, is singularly contrasted with the sensibility of the brain before mentioned. As this insensibility diminishes, as the organ is developed, so does the affectibility of the mucous membranes as age advances; so that few of the symptoms which accompany the first dentition are observed during the second. Almost all writers concur in this statement. The exceptions are observed, as might be expected, in delicate excitable children of retarded development.

At the second dentition a new set of phenomena begins to appear. The difference in the conformation of the sexes is now more strongly marked. Some traces of puberty may be observed, and the male is obviously less excitable than the female. The morbid nervous phenomena of the female at this period are especially exhibited in chorea.‡ I may here observe, that under the term chorea, I comprise irregular muscular movements only. Simple combined movements, as rotation of an extremity, or of the whole body, or rhythmical combined movements, as is Case 61, constitute a distinct class of phenomena. Sydenham, Cullen, Hamilton, Clutterbuck, Elliotson, and, indeed, almost every writer on the subject, have agreed in stating that this affection attacks youths between the ages of 7 or 8, and 14, or puberty. It has not been so generally remarked that the liability to the diseases increases as the period of puberty approaches. The following table by M. Rufz, internal pupil at the Höpital des Enfans Malades, shows very clearly the accuracy of this statement.

* Millar, Cheyne, Underwood, Marsh, Rosenstein, Ley, Darwall, Kerr.
† London Medical Gazette, Vol. xiii.
‡ Edinburgh Med. and Surg. Jour. xlii. 228, from Archiv. Gener. Feb. 1834.

Age.	Males.	Females.	Total.
1 to 4	3	2	5
4 6	2	3	5
6 10	16	45	61
10 15	30	88	118
	51	138	189

This table illustrates another general fact, that chorea attacks females more frequently than males, in the proportion of three-fourths of the whole number, as stated by Heberden, and repeated by Dr. Elliotson.* The above cases were observed among 17,213 boys, and 15,763 girls, admitted into the hospital during the ten years from 1824 to 1833. If the number of girls had been equal to the number of boys, the number of cases in females would have been 157, so that the cases occurring in boys is a fraction less than a fourth of the whole number. I shall have to notice under the head of epilepsy that the latter disease most frequently affects boys at puberty.

Chorea generally disappears at puberty, is a rare disease after that period, and when observed in young adults, had been excited by mental emotion, or depended upon organic disease in the cerebellum. This disease may also, like a paroxysm of hysteria, or *laryngismus stridulus*, be cured by mental emotion, or excited by excessive depletion, as shown by the jactitation following bloodletting. It will be found to be accompanied by the same general phenomena, *mutatis mutandis*, as those observed in the first dentition. There is spinal tenderness,† neuralgia, obstinate constipation, tender and distended abdomen,‡ altered urinary secretion, and depraved appetite. It is frequently complicated with other spasmodic diseases. The peculiar motions always commence in parts having an anatomical relation with the cranial end of the cord. There are first movement of the eyelids and rolling of the eyes; then twitchings of the face, inarticulate speech, aphonia, sneezing.§ involuntary movements of the extremities, gradually increasing in intensity, and ending, if not checked, in tetanus, epilepsy, and idiotcy. It differs from other diseases of childhood, in this particular, that the fetid medicines are of little use; mineral remedies, as iron, silver, copper, zinc, bismuth, iodine, &c., being the most efficient. This is a dissimilarity worthy notice in connection with the state of the blood in nervous diseases. The pathological appearances after death during chorea are not well ascertained. Pain in the occiput is a very common symptom during life;‖ the cerebellum is so much enlarged in a littl girl now in the hospital, with chorea,

* Clinical Lectures in London Medical Gazette, vii. 652.

† Dr. Stiebel in Brit. and For. Med. Rev. iv. 505, from Wöchenschrift die Gesem. Heilk. No. i. 1837.

‡ Case by Dr. Elliotson, Lancet, ii. 1827–28, p. 410.

§ Dr. Stiebel, op. cit.

‖ Cases by Dr. Elliotson, op. cit. p. 256, 733, by Dr. Addison, Guy's Hosp. Rep. Vol. ii. p. 503. Dr. Crawford, Cyc. Pract. Med. i. 408.

that it has given its exact shape to the occiput, so that the finger can easily define its lobes and extent. These circumstances, and the connection of the disease with the evolution of the generative organs, render it probable that the true cadaveric lesions of chorea will be found in the cerebellum.* Chorea, however, as regards both its symptomatology and pathological anatomy, has been considered by writers in general in a very limited manner. Like analogous affections it is only a symptom co existent with other phenomena which have been erroneously considered its causes, as for example constipation and spinal tenderness. Thus, the transition of the disorder into epilepsy and idiotcy, and the various morbid appearances observed in the brain of those who have died of chorea, must be considered as phenomena of the more advanced stage of one general disease of which slight choreal movements, constipation, &c., are the premonitory or initiatory symptoms. For further information I would refer the reader to the able account of the disease by Dr. Andrew Crawford, in the first volume of the Cyclopædia of Practical Medicine. Having verified a large part of the numerous references there given, I can do this confidently.

I have thus attempted to trace the appearance of certain phenomena of hysteria through infancy and childhood, to puberty, when the evolution of the sexual system, establishes a series of special relations, originates new phenomena, and renders those more prominent which complicate parts having a functional or anatomical relation to the sexual organs. In short, we are brought back to the point at which I commenced my analysis.

If we review our analysis we may deduce some positive and useful principles. We may infer that many of the phenomena of hysteria originate at other and earlier periods of development than puberty; that each period is characterized by peculiar phenomena; but also, that the great general resemblance indicates a community of origin. We may infer further, that certain general conditions of the system are necessary for the due appearance of the phenomena at any period. Dentition is not always accompanied by convulsions or constipation, nor is the period antecedent to puberty always characterized by chorea, nor puberty by hysteria. These general conditions have been considered under the second section.

We may infer, also, that the affectibility of childhood is diminished in the male on the approach, and by the accession of puberty, while in the female it is only altered in proportion as more vigorous vital powers influence the system, and becomes strikingly apparent so soon as those powers are depressed. This general fact is singularly corroborative of the embryological speculations which represent the difference of the sexes to depend upon a less or more vigorous formative nisus operating in the rudiments of the embryo.

* Case lxxviii. in Dr. Abercrombie's Researches on Diseases of the Brain and Spinal Cord, p. 171, is illustrative.

Lastly, we may infer—1, that the centre of muscular movements, and the seat of sensations and emotions are not in the hemispheres of the cerebrum,—the undeveloped organ of intellect,—but in close relation with the *medulla oblongata;* and 2, that the emotions of physical love and its accessory feelings act upon parts of the nervous system, which are in intimate connection with the same structures.

EFFECTS OF MENTAL EMOTIONS AND THEIR RELATIONS.—In nearly one-third of the cases of hysteria I have recorded, the disease originated from mental emotion;—fear or terror in the greater number, and grief or sorrow in the remainder, with one or two exceptions. These are all depressing emotions. I am not aware that the physical changes produced in the blood by mental emotions have been investigated. It is generally stated that the blood does not coagulate in those who die from violent mental emotion, just as when death follows the entrance of certain animal and vegetable poisons into the system. We may therefore infer, that the blood undergoes changes approaching this state in all cases of violent mental emotion.

It is also evident from the series of cases, that mental emotions not only affect structures in anatomical relation with the cranial end of the cord, as *à priori* might be expected, but also organs in connection with the dorso-lumbar. This fact may be observed generally in lower animals, which express emotions by the caudal extremity, as well as by the eyes, ears, lips, and neck. The horizontal and vertical movements of the tails of the feline and canine races express opposite passions. The lion lashes his tail from rage, the dog wags it from delight. The erected tail of the cat expresses fear, of the dog, confidence and courage. And so through the lips, the horse and dog express opposite emotions by the same movements. Grinning in the dog denotes rage, in the horse, amiability and pleasure. These illustrations might be multiplied to a great extent.

I shall confine myself principally to the effects of physical love and its accessaries, and of the depressing emotions; arranging their phenomena with a reference to the skin and the two extremities of the cord.

The power of the sexual passion in exciting hysteria is evident from the general fact, that it frequently follows disappointments, and affects unmarried females. Self-pollution is mentioned by Villermay as a cause of hysteria, and I believe with great justness; other writers also refer to it; I think those cases marked by irregular arterial action originate in this practice. Strong sexuality is another very evident cause, especially when combined with continence. "Salacitas major, major ad hysteriam proclivitas."* Hence that remark of Hippocrates, which has been repeated by almost every writer since his time, that the best cure of hysteria is for the patient to marry and bear children.

* Sauvages' Nosol. Method. Tom. i. p. 589.

The phenomena of nymphomania have not been minutely observed. Louyer Villermay* quotes from Helvetius and Chambon cases which were accompanied by the phenomena of hysteria in the highest degree. The same writer mentions an appearance of strangulation, great horror of liquids, and the excitation of pain and general spasms by the slightest touch, among the phenomena.† In a case he records there were distended hypogastrium, spasmodic constriction of the œsophagus, sardonic grin, hiccup, and irregularity of the pulse.‡ He also details a case observed by Alibert in the Hospital St. Louis, in which the slightest touch used to excite frighful convulsions, which continued for half an hour, the patient uttering lamentable cries, and exactly resembling a convulsionnaire of St. Médard. In this case the hips, thighs, and legs were surprisingly plump, while the chest and upper extremities were in a state of extreme emaciation.§ In another case, quoted from Steggmann, of a young girl twelve years old, sardonic laugh and extraordinary convulsive movements were accompanied by such an erection of the nipples, that they raised the shift.‖

In satyriasis the symptoms are somewhat analogous. Duprest Rony quotes a case¶ in which there was painful sensibility of all the organs of sense, analogous to that of phrenitis or hydrophobia. Crichton gives a case at length of erotomania bordering on satyriasis, which terminated fatally on the fifth or sixth day with all the symptoms of hydrophobia.**

Villermay lays great stress on the cannection of herpetic and other diseases of the skin with nymphomania. The greater part of this author's details and others may be found in an elaborate essay on this disease by Dr. Davis in his Obstetric Medicine, p. 444.

The passions acting through the sexual system excite singular effects. Cabanis gives a curious instance of the effect of jealousy in exciting priapism. "J'ai connu un jeune étudiant en mèdicine qui, dans un violent accès de jalousie, éprouva pendant plusieurs heurs le priapisme le plus invincible et le plus douloureux, accompagné tourà tour de pertes de semence et d'emissions d'un sang prèsque pur."††

Montagne gives, in his essays, some curious instances of the effect of fear. Analogous is the paralysis of the bladder, which many experience when they attempt to pass urine in the presence of others. Mental agitation occasionally excites spasmodic stricture of the urethra.‡‡ Surprise or anxiety will check uterine action, as most accoucheurs must have noticed during their juvenile practice. Fear for offspring may be classed under this head. A lady of my acquaintance, in good health, was informed that her little boy had

* Dict. des. Scien. Med. xxxvi. p. 566.

† Ibid. p. 570, 571. ‡ Ibid. 580.

§ Op. cit. 582. ‖ Ibid. 591. ¶ Op. cit. Tom. i. p. 51.

** From Psych. Mag. v. part. ii. article iv., in his Inquiry into the Nature and Origin of Mental Derangement, 2 volumes, 8vo., 1798, Vol. ii. p. 322.

†† Rapports du Phys. et du Mor. de l'Homme, 3d ed. ii. p. 402.

‡‡ Case in London Medical Gazette, i. 807.

been leaning out of a chamber window in a very dangerous position. She immediately felt sudden faintness and pain in the occiput, and soon after violent spasmodic colic and great tenderness of the abdomen. Fear in general has the most marked influence on the organs affected in hysteria. Children from very slight emotions of this kind will have diarrhœa, frequent and involuntary micturition, and involuntary movements. The effects of extreme fear will most elucidate the subject if given in a connected order. 1. Chorea, convulsions, hysteric paroxysms, syncope, coma, catalepsy. 2. Constriction of the scalp, paleness of the face, spasms of the facial muscles, spasms of the glottis, aphonia, gasping, palpitation. 3. Menorrhagia or suppressed menses, diarrhœa, increased flow of urine, and frequent desire to pass it; relaxation of the sphincters, loss of power over the legs. 4. Profuse sweats, increased or diminished secretion of colouring matter from the cutis,* suppressed flow of milk.

In the effects of grief we have the same symptoms, some being more, others less obvious. The symptoms indicating an affection of the cerebro-spinal centre are the same in both. The convulsive movements of the face and respiratory muscles, in general, are more obvious, and we have well-marked globus, sobbing, and lachrymation. The respiration is slow and oppressed, the action of the heart impeded, and there is a peculiarly beautiful sensation in the epigastrium. Dr. Crichton states, that this affection is almost peculiar to females, and that he has seen two instances in which it was accompanied by hemorrhages from the stomach, lungs, and uterus.† Sometimes the intestines will ulcerate.

After this general statement there can be no difficulty in conceiving why mental emotions should so frequently excite deranged action in the generative system and the whole train of hysterical phenomena. But there is another point in the history of mental emotions which should not be forgotten, namely, the power they possess of curing certain diseases of the nervous system. This fact is so notorious as to require no comment; and I mention it now with reference to those cases of hysteria in which imposition is suspected; for if fear will restore the maniac to reason,‡ arrest or prevent violent sea-sickness,§ excite the secretion of urine after having been long suppressed, (Case 5,) and arrest imitative convulsions or barking cough, (Case 1,) it is plain that we must not hastily conclude a patient is malingering because certain

* M. Rostan (in Nouveau Journal de Mèdecine, 1819,) relates the history of a female who was imprisoned during the French revolution, and threatened with execution while menstruating. Her skin in consequence assumed permanently the hue of the less dark negro. Blanched hair is a consequence of fright. The executed Queen of France experienced this change; and an analogous case is given in Arch. Gen. 1827.

† An Inquiry, &c. Vol. ii. p. 190.

‡ Med. Chir. Rev. xxvii. 540.

§ Zoonomia, 3d. ed. Vol. i. p. 333. Darwin mentions his personal experience while at sea.

symptoms disappear after threats have been used. In Case 49 the nurse thought the patient vomited wilfully when the medical officers visited her; yet the vomiting really followed mental excitement.

Effects of Blood-letting.—These, like the effects of emotions, are amply shown in the cases detailed. A general review of them will be useful. The convulsions and hiccup excited by great loss of blood were noticed by Hippocrates. Boerhaave mentions it in his list of causes of convulsions,* and Van Swieten states that slain animals afford daily illustrations of the fact, as well as the results of flooding in parturient females.† Dr. Armstrong says, that bleeding children to syncope may sometimes induce even fatal convulsions, and Dr. Kellie also remarks, that fits of apoplexy and epilepsy occasionally follow bleeding from the arm.‡ The effects of loss of blood are always most obvious in females and delicate males. Arranged with reference to the two ends of the spinal cord, and to their progressive intensity, we have in the first stage, syncope, convulsions, profuse perspiration, vomiting, relaxation of the sphincters, increased micturition, diarrhœa; 2. Pain and throbbing of the temples, sense of weight in the vertex, irregular action of the heart. "The respiration is affected in different cases, with panting, heavy sighing, heaving, blowing, moaning, gasping, catching, &c. There is in some cases an irritative cough, in violent fits, or in the form of perpetual hacking, apparently arising from an affection of the trachea. The stomach is liable to be affected with retching, vomiting, hiccough, and eructation, and the bowels, even in cases in which they were not previously disordered, become variously deranged with constipation, diarrhœa, and flatulency. In some cases there are various spasmodic affections; in other instances, catching pains, which are apt to be mistaken for inflammation. Every source of disturbance, or of anxiety, or of alarm, and every effort, whether of mind or body, is apt to be followed by a return or exasperation of the symptoms,"§ and there is morbid sensibility of the skin and senses in general.‖ 3. Jactitation or choreal movements, delirium, paralysis, blindness, deafness, slight insensibility increasing to apoplectic coma; jerking of the legs, relaxation of the sphincters, diarrhœa or constipation, tympanitic distension. In a word, the whole train of symptoms which may be observed in a case of aggravated hysteria (*e. g.*, Cases 6, 15, 33, 35). Loss of blood, then, acts on the same parts of the nervous system as the exciting causes of hysteria, and is one of the latter.

* Comment. apud Boerhaave, Tom. i. 376, 377, ed. 2da.

† On Puerperal Fever, p. 191, 2d ed. ‡ Edin. Med. Chir. Trans. i. 105.

§ Quoted from the chapter "on the effects of loss of blood in the puerperal state," in Comm. on the Diseases of Females, by M. Hall, M.D., p. 226, 227, 8vo., London, 1827.

‖ "Copious bleeding excites increased sensibility of the surface, and hence the precept not to apply blisters to individuals who have been so treated." Andral, Lectures on Diseases of Nervous System, in Medical Gazette, xvii. 586.

Effects of Poisons.—Many of these will be best discussed under the next head, as those following the bites of certain animals, namely rabid dogs, certain arachnidæ, and reptiles, and those consequent on the introduction of acro-narcotic vegetable poisons into the system. The action of the mineral poisons, mercury, arsenic, antimony, iron, gold, lead, silver, zinc, bismuth, and iodine, on organs implicated in the phenomena under consideration, and on the nervous system in general, in causing and curing paralytic, spasmodic, and neuralgic affections, is a subject of the highest importance. Thus antimony and arsenic act specially on the stomach; mercury and arsenic on the generative organs; mercury, gold, antimony, and iodine on the salivary glands; zinc, arsenic, and antimony, cure malarious diseases; iron, silver, and copper, epilepsy; mercury, iodine, and lead, cause neuralgia and paralysis.

Phenomena of certain Diseases of the Nervous System.—I shall attempt a review of those only which specially elucidate the subject. They may all be arranged as they depend on increased or diminished motive or sensitive power, and must be reviewed with reference to the morbid affectibility of hysteria, and to their connection with the two ends of the spinal cord.

This morbid affectibility, considered in its relation to lesions of motion and sensation, is worthy of an extended notice. It may be confined to one portion only of the mucous surfaces, (including the skin,) or implicate the whole. It may exalt the sense of touch only, or all the senses, as well internal as external, and give rise to singular acuteness of hearing, seeing, feeling, smelling, and of certain intellectual powers, as those connected with rhythmical sensations and motions. With regard to its agency as the immediate cause of convulsions, a slight touch of the surface, (Cases 59, 60, 62), an attempt to swallow, or the introduction of a probang (48), or a current of cold air passing over the pharyngo-laryngeal surface; the slightest mental emotions (31, 35, 41, 48, 49); the hearing of water dropping, or the sight of it, or anything transparent, or of certain colours, especially red and green, or scarlet and white,* may all be the immediate exciting causes of convulsive movements.

As regards local affectibility. In my previous paper I have attempted to show that the circumscribed or local tenderness observed over the spinal column, in a great variety of diseases, could not be considered as a sign of tenderness of the spinal cord. The general sensibility, to use the words of Dr. Elliotson (60), "is purely a state of the sentient nerves;" and these cases of local tenderness are precisely analogous. We find the symptom almost peculiar to the median line, in which there may be some physiological connection between the two halves of the nervous system of

* Parry, Cases of Tetanus and Rabies Contag. p. 106. Bath, 1814.

the whole body. This is shown by the *clavus* and sense of weight felt on the vertex in hysteria, and by all cases of spinal tenderness. I by no means wish to advance that local circumstances, as the transmission of a nerve through a bony foramen, or its compression by a tendon, or by morbid structures, will not induce pain and tenderness referred to that part of the surface to which it is distributed, or even such a degree of neuralgic sensibility that convulsions will follow a slight touch. I rather maintain the contrary; but in hysteria, gasp (which is a sudden spasmodic action of the respiratory muscles) will rarely be excited by pressure on any other part than the anterior or posterior median line.* When gasping is so excited, it may be considered analogous to every other gasping, however produced; differing in this respect, that the spasmodic action of the parts implicated is excited by a slight cause, because the affectibility of the nerves of the skin, in connection with the pneumogastric and phrenic, is exalted. This is probably the reason why pressure on the middle of the sternum will excite gasping and spasm, as readily as if made on the cervical and dorsal vertebræ; and the access of cold air to the larynx or *bronchi*, or of cold water to the skin, have similar effects in poisoning by arsenic,† *entasia lyssa*, tetanus, *laryngismus stridulus*, or cases of hysteria. The nausea and vomiting consequent on the ingestion of animal food, a symptom so common in aggravated hysteria, probably originates in a similar morbid sensibility of the stomach. This symptom is very strongly marked in a case of hemorrhagic hysteria (Löis, Dalton), now in the hospital, in which I suspect there has been ulceration of the stomach.

The psychological phenomena connected with this morbid affectibility will be noticed in their proper place. At present I must

* "A young married lady, who was liable to ordinary attacks of hysteria, complained of a tender spot on the anterior part of the abdomen, a little below the ensiform cartilage. The slightest pressure of the finger on it caused excessive pain, and violent convulsive movements of the whole person, resembling those of chorea."—Sir B. Brodie, Medical Gazette, xix. 250. A hysterial female, named Hebditch, aged 38, came into the York Hospital with extensive sloughing of the tonsils. When recovering, she complained of a tender spot on the centre of the sternum. Pressure upon it, and on the opposite point on the back, caused gasping. She would not permit me to touch both points at once; she was sure it would suffocate her. Tenesmus, griping, and flow of blood from the anus came on: she then menstruated, and immediately recovered.—See another case at page 59. It would appear from Weber's experiments that there are portions of surface on the anterior and posterior median thoracic line more sensitive in a state of health than the rest. When Weber applied the points of the compasses on a line round the thorax, two spots were found on the mesial line before and behind, on which the sensibility was more defined than elsewhere. The cases just mentioned constitute very interesting corroborative proof of the accuracy of this observation.

Exquisite sensibility of the rectum, or rather of the anus, has been mistaken for stricture of that part, but it is nothing more than a hysterical local neuralgia. There is a case now in the hospital in a very nervous female. This affection is exactly analogous to the preceding; it is a natural sensibility exalted.

† Case quoted in Dr. Christison's Treatise on Poisons. Edin. 1829. p. 216.

confine myself to a review of those diseases in which it is most particularly observed. These are, spasmodic asthma, *angina pectoris*, tetanus, the effects of certain poisons, epilepsy, some forms of neuralgia, and paralysis.

Spasmodic Asthma.—In the true nervous asthma we have a morbid local affectibility affecting the respiratory system, especially of males.* This is a point of dissimilarity, the investigation of which, in connection with the thoracic development of the male, might lead to some important results. It is worthy of notice, that, like a large number of paroxysmal diseases, it is heptaperiodic, or occurs at periods of seven or their multiples. Heberden mentions a case in which the paroxysm was septennial. "In one case mentioned by Wainwright, the paroxysms always returned at the menstrual period, during seven years; and in another recorded by Fransieri in the first volume of the Memoirs of the Royal Academy of Madrid, they are stated to have recurred at every new and full moon, for no less a period" than three times seven years.† This periodicity alone presents an ample field for investigation, especially in its relations to development. It is clearly an effect of some very general law. Independently of the periodical recurrence of this affectible state, all depressing causes will excite a paroxysm, as exposure to cold, indigestion, any slight exertion, mental emotions, &c. Like other spasmodic diseases its attacks generally recur at night. Dr. Forbes has traced an analogy between this disease, (which he considers spasm of the muscular fibres of the *bronchi*,) and spasm of the glottis.‡ He thinks the respiratory muscles are not involved in the spasmodic action. The spasmodic ejection of the feces during a paroxysm, and the positive testimony of asthmatics, shows that this opinion is contrary to fact. A sufferer describing his feelings says, "the spasmodic heavings of the chest during severe fits, were so violent as to produce a concavity in the abdomen, and to exhibit the muscles of the abdomen like tightly-drawn cords, stretching from the chest to the pubes."§ So that the disease is probably spasm of both the respiratory tubes and muscles. The general symptoms accompanying a paroxysm are heaviness over the eyes, a trance-like state‖ and drowsiness; impatient temper,¶ profuse flow of saliva,** sometimes tasting saline;†† occasionally dryness of the mouth, and arrested salivary secretion; copious flow of pale urine and diarrhœa. "Flatus of the stomach and colon are seldom absent in spasmodic asthma;"‡‡ and there is rachialgia.§§

Angina pectoris.—This disease is also peculiar to males. Of 88 cases noticed in various writers by Dr. Forbes, only eight were in

* Dr. Forbes, and quoting Frank, in Cycl. Pract. Med. i. p. 185.
† Dr. Forbes' Essay, op. cit. 185.
‡ Ibid.
§ Journal of an Asthmatic, Dublin Journal, xiii. 24.
‖ Ibid.
¶ Bree on Disordered Respiration, 4th edition, 139.
** Journal of an Asthmatic, op. cit. 25.
†† Ibid.
‡‡ Bree, op. cit. 25.
§§ Journal of an Asthmatic, op. cit. 30.

females; one-half of these were cured or relieved, while six-sevenths of the males died, or were unrelieved, but only two females died,* It is not improbable that some of these cases, especially the cured, were forms of functional disease. *Angina pectoris* is essentially a neuralgia of the heart, and may depend upon functional or organic changes in the nerves of that viscus.† The affectibility of those suffering from angina is clearly analogous to that of certain other neuralgic and spasmodic affections. A breath of cold air, sneezing, or any slight muscular effort, or the state of the system about midnight, will induce a paroxysm. So also a mental effort will either induce or prevent it.‡ It appears to be hereditary.§ The neuralgic affectibility in this as well as other diseases of the heart extends to the median line, so that a slight touch or pressure will excite a gasp. The posterior median line, however, seems more sensible than the anterior. Just as in the analogous disease, asthma, the stomach and colon are distended with flatulence, but especially the stomach. Dr. Forbes‖ thinks there is little reason to doubt that the gas is formed in the intestinal canal during or immediately before the paroxysm.¶ I have already alluded to this flatulent distension in the first division of the analysis, and given reasons for considering it to originate in a secretion perfectly analogous to the increased flow of saliva and urine, observed in nervous affections. It is not a cause of the paroxysm, as has been frequently supposed, but a coexistent effect; and in like manner, when the paroxysm is subsiding, and the stomach regains its contractile power and expels the flatus, we have not two circumstances standing to each other in the relation of cause and effect, but simply coexistent. Individuals have angina in its most incipient stage, namely, intermittent pulse, sense of uneasiness in the thorax, and flatulent distension of the stomach; but they ascribe the intermittent pulse to flatus, whereas the phenomena are all coexistent symptoms originating in one general cause. This species of angina will be occasionally excited by mental exertion without being accompanied by flatulence. It is then attributed to its right origin. I need only add, that the general remarks applicable to local neuralgia are equally applicable to *angina pectoris.*

Tetanic Spasms.—These are common in hysteria. The affectibility of the surface in traumatic tetanus is automatic, that is to say, the agents which, applied to mucous surfaces, excite the tetanic spasms do not excite painful sensations. In short, there is no neuralgic sensibility. This is a distinction of considerable importance. The tetanic state first shows itself by involuntary jerkings in the wounded limb, if the leg be the seat of the injury. This symptom

* Cyclopedia of Practical Medicine, Art. Angina pectoris, i. p. 83.
† Ibid. 86.
‡ Dr. Black, Medico-Chirurgical Transactions, vii. 75.
§ Dr. R. Hamilton, Med. Comm. ix. 312.
‖ Op. cit. i. 91.
¶ Op. cit. Vol. cit. 91.

is precisely analogous to the involuntary movements of the paralytic, and the "jumping" of the fractured leg. After a while the (so called) extensors in connection with the cranial and cervical portion of the spinal cord are affected, and trismus and rigidity of the throat muscles come on, before those of the back and lower extremities are involved in the spasm. Antecedently to this completion of the tetanic state, the automatic affectibility is fully established. A very slight mental emotion will excite a paroxysm. The very sight of water,* cold suffusion,† the attempt to swallow,‡ or tapping the epigastrium gently will have the same effect.§ Even the contact of the skin of the back with the bed-clothes will cause emprothotonos or violent and agonizing convulsions.‖ This is a point worthy more particular observation in connection with Bellingeri's theory of muscular antagonism. In a case of "Pott's disease," reported by Dr. Elliot,¶ in which there were violent involuntary movements without consciousness, friction upon the sacrum excited the flexors of the legs to act, while the same stimulus to the ileum excited the action of the extensors. Is it possible that stimulation of the skin of the back will specially excite the extensors of the back? or are not these extensors, physiologically, flexors? The general symptoms of tetanus are excessive cardiac action, vitiated secretion of saliva, profuse perspiration, and occasionally a miliary eruption; scanty urine, very constantly, obstinate constipation, rarely, vomiting, and never cough. This is an important point of dissimilarity. The pathological phenomena are an inflamed or highly vascular state of the pharynx, œsophagus, larynx, and bronchi; of the lower portion of the ileum and of the cæcum. Dr. O'Beirne asserts that distension of the cæcum and colon is the only constant pathological appearance. From the perusal of several dissections, I am induced to think this assertion much too exclusive. The *meninges* are frequently injected.

The tetanic spasms of hysteria differ from those of traumatic tetanus, in being accompanied by increased psychical sensibility, in which is probably involved the automatic affectibility before-mentioned. They are frequently local, being confined to one-half of the body, especially the left, or to one extremity, or one set of muscles. Cramp is a species of tetanus, the predisposing cause being the state of the nervous system during sleep, the exciting, some irritation in the lower bowels. I would here observe that spasmodic action, of whatever duration, may be denominated tetanic, and the term in this general sense may serve to include the spasms of entasia lyssa, or of hysterical hydrophobia. When the

* Dr. Symonds, Art. Tetanus, Cycl. of Pract. Med. iv. 670.

† Aretæus de Causis et Signis, ac. lib. i. cap. vi.—Dr. Parry, Cases of Tetanus, &c., p. 4.—Dr. Bright, Guy's Hospital Reports, i. p. 111.

‡ Dr. Dickson, Med. Chir. Trans. vii. 457.—Dr. Macarthur, Ibid. 469. Lond. Medical Gazette, i. 645, and vi.—Dr. Symonds, op. et loco cit.

§ Dr. Anderson, Medico-Chirurgical Transactions, ii. 319.

‖ London Medical Gazette, vii. 428. ¶ Ibid. xxii. 17.

spasms are of short duration and frequently repeated, they are convulsive, as in epilepsy.

Effects of Certain Poisons.—1. Of animal poisons; namely, those consequent on the bite of a rabid dog, and of certain arachnidæ; and following the ingestion of cantharides. 2. The effects of some acro-narcotic vegetable poisons.

Hydrophobia, or Entasia lyssa.—With regard to the symptoms of spontaneous rabies in the dog, there appears little resemblance between them and those observed in animals bitten. The dog has none of that exquisite sensibility which is the most prominent of the latter. Its temper is irritable, appetite wanting, or so depraved that it will eat its own excrement. The conjunctivæ are injected, there is a flow of saliva, dyspnœa, attempts to vomit, inability to pass urine and fæces, and paralysis of the head and legs.* But in poisoned pigs Mr. Gilman† found the symptoms remarkably modified. These pigs had inflamed conjunctivæ, rigors and paralysis of the hind legs, and also anhelation and violent convulsive movements on attempting to take food or drink, or from the slightest mental excitement as that produced by stamping on the ground at a distance from the animal. In short, exquisite sensibility inducing violent muscular action from the slightest cause. In the dog then, the poisonous matter is a morbid secretion, but not acting as a poison on that animal unless, perhaps, when bitten.

The principal cadaveric phenomena noticed by Mr. Gilman in pigs and dogs, were in organs in connection with the cranial cord. In pigs there was inflammation of the under surface of the œsophagus; in dogs, of the parotid and salivary glands, the uvula, fauces, under surface of the epiglottis, pharynx, œsophagus, and stomach.

In man, the first circumstance noticed is the extreme affectibility of the nervous system; this is indicated in an early stage by pain in the wound. A painful sensation is next felt about the throat, (a symptom very common in all envenomed wounds,) and a distinct increase of power to listen to sounds and detect smells which no one else can observe; light is distressing, and the skin, particularly of the scalp, is very sensible to impressions; a tickling sensation is then perceived, which at last becomes painful, and ends in anæsthesia. There is also mental irritability, dyspnœa and convulsive movements are excited by the least noise, as a whisper, or from a current of air, or on the sight of certain colours, or of brightness. Delirium, paraplegia, and impaired senses, general tetanic spasm or convulsions, and apoplectic coma, precede death. The local symptoms arranged according to the plan I have adopted are as follows: eyes bright and rolling; angles of mouth retracted; flow of saliva; spasm at the root of the tongue; pain and enlargement of the thyroid gland; pain in the throat; violent cough; laryngeal

* Mr. Gilman, Prize Dissertation on the Bite of a Rabid Animal. Lond. 1812.
† Ibid.

spasm and anhelation on the slightest excitement; very quick pulse; nausea and vomiting; flatulent distension of the stomach and bowels; urine milky, and passed involuntarily; paraplegia.* Every one of these symptoms may be observed in cases of hysteria.

The increased sensibility, especially of the pharyngo-laryngeal surfaces, gives rise to a series of phenomena, which, being more prominent than the others, have given their name to the disease. The case, however, is really one of poisoning, and the phenomena are analogous to those of tarantism and of poisoning by cantharides, strychnia, or arsenic.

Tarantism.—Under this term are comprised the effects resulting from the bite of certain arachnidæ, especially the scorpion of South Italy, and the tarantula spider. As the existence of the disease has been denied, like that of many other anomalous phenomena, I shall defer the review of it; and merely remark here, that there is nothing so remarkable in the acknowledged phenomena of tarantism as to render their existence apocryphal.

Effects of Cantharides.—In addition to the well known effects of this drug on the genito-urinary organs, an "affection of the throat, causing difficult deglutition, and even an aversion to liquids, appears to be pretty constant."† An instance is also related in the Transactions of the Turin Academy,‡ of tetanic convulsions and hydrophobia appearing three days after a small dose of the tincture of cantharides was taken, and continuing for several days with extreme violence; tetanus was induced by a slight touch. In a boy who took an ounce of the tincture by mistake for laudanum, general convulsions came on at intervals. During the remission he was insensible, and his limbs retained for any length of time the position in which they were placed. He seemed to recover, but he predicted the day of his death, and on the day mentioned, the convulsions returned, and he died.§

Effects of certain vegetable poisons.—Strychnia excites phenomena very analogous to those of tetanus. There are the most violent tetanic convulsions of the whole muscular system. When they remit a slight touch of the surface immediately re-excites them. This state of spasm and acute automatic (?) sensibility follows poisoning by brucia. The latter acts on segments of the nervous system through the circulation. Professor Emmert of Berlin severed the spinal cord, and inserted the poison in a wound of the hind-leg; both anterior and posterior extremities became tetanic.‖ More recent researches show, that if solution of nitrate of strychnia be in-

* These are not, of course, to be expected in each individual case. The list is taken from Gilman's, Parry's, and Bardsley's respective works on the subject; especially the article by the latter, in the Cycl. of Pract. Med. ii. 483. Cases reported in Med. Chir. Trans. the Edin. Med. and Surg. Journal, the London Med. Gaz. and the Lancet, have also been laid under contribution.

† Dr. Christison, Treatise on Poisons, p. 456.

‡ Quoted in Ibid. 457, and at length by Orfila, Toxicol. Gen. i.

§ London Medical Gazette, xv. 320.

‖ Quoted by Dr. Symonds in Cyclopedia of Practical Medicine, iv. 679.

troduced under the skin of pigs, tetanic convulsions of the hind-legs do not occur after division of the spinal cord.* The roots of cicuta when eaten, excite epilepsy and tetanus.† Opium acts on frogs just like strychnia, (Müller,) exciting tetanus, &c.; solanum produces convulsive movements, heat of throat, and erections of the penis;‡ henbane,—epileptic convulsions and symptoms like those of poisoning by belladonna;§ belladonna and stramonium,—delirium, laughter, weeping, spectral illusions, somnambulism, jactitation, or choreal movements, aphonia, croupy cough, and hydrophobic gasping.‖

Epilepsy.—The great variety of causes of epilepsy, as given by systematic writers, may be classed under three heads,—1. The form, the nature of which is least known, originates in an hereditary malconformation, which seems somewhat analogous to the hemorrhagic and tubercular diatheses. 2. Another kind is concomitant with organic change in the nervous centres, originating in accident or disease. 3. The third includes those epilepsies caused by functional excitement of the encephalon, or of the extremities of nerves. I shall only allude very generally to epilepsy of the last species.

In using the term epilepsy, it must be understood to have a very extensive application. Partial convulsions, as of one arm or leg, are called epileptic,¶ although they occur without loss of consciousness, or subsequent coma; simply because they frequently precede the true epileptic state. They are generally premonitory of epilepsies arising from causes under the second head. A sudden faintness with vertigo, and mental disturbance lasting but a few seconds (*leipothymia*) has been considered epileptic, from its occurrence as a premonitory symptom. It is frequently concomitant with derangement of the stomach and bowels; I have known it excited by laughter. Epilepsy may be also partial with respect to the seat of muscles involved in the spasmodic movements. In the genuine and common form, there is violent, involuntary, and alternate contraction of all the muscles of the body; but if the contraction affect the extensors only, and is not alternate but continuous, the paroxysm assumes the tetanic form.**

If we review the phenomena of epilepsy in reference to their exciting causes and the organs they implicate, little difference will be found between them and the phenomena of other paroxysmal dis-

* By Dr. Stannius in Müller's Archives, Hefft ii. 1837. Also Müller's Physiology by Baly, p. 629.

† Sauvages' Nosol. Method. ii. 574. Merat et De Lens, Dict. de Matière Med. &c., ii. 282.

‡ Sauvages', Nosol. Method. vi. 414. Medico-Chirurgical Review, xx. 205.

§ Ibid. lii. 571.

‖ Mr. Duffin, London Medical Gazette, xv. 194. Jour. Hebdom. 1835. Jour. Univers. xxii. 239.

¶ Boerhaave, Aphor. Sect. 1089.

** Dr. Cooke on Nervous Disorders, ii. 17. Dr. Cheyne, Cyclopædia of Practical Medicine, ii. 91.

eases of the nervous system. In most cases mental emotion will induce* and prevent† a paroxysm. Like the more violent paroxysms of hysteria, infantile convulsions, and neuralgic and spasmodic affections in general, the fit most frequently occurs during the night. Like these, the disease is most relieved or cured by mineral remedies, fœtid stimulants, change of air and regimen; like these also, it may be excited by stimuli to the mucous surfaces, especially the genito-urinary. Like all spasmodic affections not immediately fatal, and dependent on functional derangement, whether caused by poisons or otherwise, it is frequently accompanied by some morbid state of the skin. And, like several of them, its premonitory and paroxysmal phenomena implicate the external senses, exalting or diminishing their sensibility; the salivary glands; the respiratory and gastric nerves; and the parts in connection with the lower end of the spinal cord. These remarks are intended to apply especially to those cases depending on functional derangement.

The most interesting point of dissimilarity between epilepsy and hysteria is, that epilepsy much oftener attacks males than females, having the same relation to the former as chorea has to the latter. Van Swieten states, that it is from this circumstance the synonym, *morbus puerilis*, originates, and quotes Hippocrates,‡ and Paulus Ægineta.§ Celsus, probably following these, remarks the liability of young males to epileptic affections,‖ and Dr. Elliotson adds his testimony to the same effect.¶ It usually disappears, like chorea, on the accession of puberty. This general fact is important when taken in connection with the supposed functions of the cerebellum, as also that expressed in the phrase which has been attributed to Hippocrates or Democritus, τὴν σονουσίαν εἶναι μικρὰν ἐπιληψίαν,** the development of the full paroxysm during the *synousia*, and by onanism,†† and its frequent heptaperiodic recurrence. Perhaps puerperal convulsions are allied.

The epileptic aura in connection with local hysterical neuralgia and neuralgic convulsions is worthy special notice. The phenomena of this aura are well known. It has been supposed to originate, firstly, from a diseased state of the nerve in which it commences, and, secondly, from organic change in the brain or its coverings. With regard to the proofs of the latter, they are merely negative. The trunks of the nerves implicated have been seldom examined through their whole extent; while changes in the brain and nerves may take place during life of which there is no necroscopic trace. In proof that the aura originates from disease in the distal extremity of the nerve or in its trunk, we have several positive

* Boerhaave and Van Swieten. Comm. iii. 402.

† A boy could ward off a fit of epilepsy by biting his tongue. Dr. Seymour, Clinical Lectures, Medical Gazette, xix. 154.

‡ De Aeris et Locis. § Lib. iii. cap. xiii. ‖ Lib. iii. cap. xxiii.

¶ Clinical Lectures in London Medical Gazette, vii. 482.

** Van Swieten Comm. apud Boerhaave, iii. 412.

†† Medical Gazette, loc. cit.

facts. A ligature applied to the limb affected will arrest both the aura and paroxysm. This remedial measure, as well as the destruction of the part in which the aura originated, is probably very ancient. Paulus Ægineta recommends a ligature to be applied during the fit, and escharotics in the interval to the part affected. "Curatio comitialis ex aliqua parte oborti. Quum symptoma futurum est, ubi senserint, partem sive manus sit, sive pes laqueo superpositam fortiter apprehendere oportet. In remissionibus autem curationem moliri, ex ustoriis medicamentis aliquod parti adhibendo," &c.* Galen arrested the paroxysms in a boy by a ligature.† Bonetus was equally successful, and records a case in which the part swelled when the aura was felt.‡ Van Swieten expressly mentions destroying the nervous communication between the point at which the aura commences and the brain, as a means of cure. "Nullum amplius convulsionis adsit periculum, quia omne commercium inter cerebrum et nervum læsum sublatum est."§ The use of the ligature is now practised on the continent,‖ and Dr. Elliotson¶ and Sir A. Cooper have recorded instances of its successful application. Dr. Craigie has given a hypothetical opinion, that the presence of a morbid growth in the nerve is the material cause of the aura, in the 29th vol. of the Ed. Med. and Sur. Jour., and mentions the case recorded by Dr. Short,** who, by cutting out a minute painful tumour from the gastroncnemius, from which an aura proceeded, cured an epilepsy. Portal relates a similar instance;†† and Dr. Craigie quotes Mojon and Covercelli, as recently verifying these observations, both of whom found minute painful tumours connected with epileptic fits. Professor Mayer, of Hanover, cured a patient of epilepsy by amputating the thumb in which the aura commenced.‡‡ The inference to be drawn from these facts is, that the disease of the nervous twig is the cause of the aura, and in some instances, probably the cause of the fit; probably, because epilepsy like other paroxysmal diseases, may be cured (as I have already shown), as well as induced by strong mental emotion, the mental impression made by tying the ligature or removing the tumour, being the really curative means, as in the case of the boy, quoted page 125. A ligature will sometimes arrest a paroxysm of ague. Dr. Black's patient, by concentrating his attention, could prevent a paroxysm of *angina pectoris*.§§ Upon the whole, then, we may conclude, that a state of the nervous system precedes each paroxysm, which is indicated by the sensation of aura in any nerve in which there is already organic or functional derangement. If no one nervous twig be more diseased than another, then we have the epileptic paroxysm without the premonitory sensation. It must be admitted, however, that the touch of a morbidly sensitive fibril may

* Pauli Æginetæ, Lib. iii. cap. xiii.
† De locis affectis. iii. cap. xi.
‡ Sepulch. Anat. Lib. i. Sect. vii.
§ Comment. Apud Boerhaave, i. 380.
‖ London Medical Gazette, ii. 46.
¶ Lancet, xi. 222.
** Medical Essays and Observations, vi.
†† Cours d'Anatomie Med. iv. 247.
‡‡ Med. Chir. Trans. viii. 250.
§§ Ibid. vii. 75.

be the immediate or exciting cause of the paroxysm as readily as any other excitement, whether mental or acting on the peripheral terminations of the nerves, or, as when gasping is excited by pressure on the sternum.

In *neuralgia* and neuralgic convulsions we have phenomena analogous to those of the epileptic paroxysm. There is the same general morbid affectibility, equally exalted, as in epilepsy, by quotidian or heptaperiodic causes of excitement, or by impaired functions of special organs. Any casual excitement also, whether originating in the mind, or on the mucous surfaces, may be the immediate cause of a paroxysm, and the predisposition is frequently hereditary. There is a species of neuralgia which answers to this description, but which frequently attacks males. This form ought to be distinguished from the neuralgic sensibility of the hysterical. It most frequently arises from mechanical irritation of a nerve, while that of hysteria may originate in mere vascular congestion. In the hysterical neuralgia, the whole nervous system is actively sensitive; in the other form, this sensibility, already existing as a dormant constitutional predisposition, is excited into action by local agencies. In the one, those medicines which relieve paroxysms of gout are very beneficial, but seldom so in the other. Sometimes the two forms of the affection seem combined in the same individual, as in the neuralgic stumps of females. In these cases re-amputation is seldom useful, on account of the excessive sensibility of the nervous system. Exercise in the open air, and mineral tonics, appear to have been the best remedies.

The *neuralgic convulsions* of the hysterical originate principally in this class of cases, and are sometimes followed by coma.* A very slight injury to a nervous fibril, as from the puncture of the lancet, or of a pin or needle, is sufficient to induce the local changes through which the general convulsions may be excited.† They are almost peculiar to the female, for convulsions are seldom excited in males having the neuralgic diathesis, and then only when depletion or other depressing agencies have produced an affectible state of the whole nervous system.

Subcutaneous tubercle is an occasional cause of hysterical and neuralgic paroxysms. We are much indebted to Mr. Wood‡ for his laborious inquiries into the nature of this affection. It is a neuralgia excited by a small, firm tubercle which involves a nervous twig, and generally a twig distributed to the skin. Like most nervous diseases, it principally attacks females. Of 36 cases collected by Mr. Wood, 29 were females, five males, and two unknown. In 23 the tubercle was in the lower, and in 11 on the upper extremity. In the males it followed blows or punctures, in the females, it originated spontaneously, and for the most part on

* On Morbid Local Affections of Nerves, 1st edition, p. 113, 117.
† Sir B. Brodie, Case in his Lectures, London Medical Gazette, xix. 248.
‡ Edinburgh Medico-Chirurgical Transactions, Vol. iii.

the lower extremities. The neuralgic paroxysms and convulsions, of which these tubercles are the exciting cause, are subject to the same general agencies as other nervous diseases. The paroxysms may be excited by a slight touch of the tubercle, by a cold wind, by surprise, or any affection of the mind (Swan). They occur most frequently at night (Hall, Wood, and others); during menstruation and pregnancy (Bissett, Pearson); or any general indisposition or dyspeptic state (Hall). Case 38 is an instance of this class.

After the varied general remarks on the increased insensibility of the hysterical, it will be quite unnecessary to specify the local neuralgiæ. They may originate from a morbid change of structure in the distal end of a sensitive twig, or be developed by compression or irritation of the nerve in the foramen through which it passes, or by some tumour in close proximity with it, in any part of its course from the circumference to the centre. When the affectibility of the nerve is exalted, any slight cause of these kinds will excite neuralgic pains, and this exaltation of the affectibility may originate locally, as I have already shown, from any functional or organic derangement of the viscera. Sciatic neuralgia and the neuralgic knee, in diseases of the hip, is an illustration of these remarks. The hysterical knee originates, probably, in some excitement applied to the superficial branches of the anterior crural nerve, either as they emerge from the fascia, or (as I believe much more frequently happens), during their course within the pelvis. Some similar irritation applied to the supra-scapular nerve in its course through the foramen or notch of the same name, is the cause of the sub-scapular pain observed in diseases of the liver; the sensibility of the nerve being so exalted by the diseased state of the liver, as to render those impressions painful, which otherwise would not be felt, just as occurs in spinal tenderness.

These hysterical neuralgiæ and local affectibilities, then, may be divided into two classes. The one will comprise those originating in a nerve which has to pass through a foramen, or over or round a tendon or ligament; the other, those implicating parts in physiological or anatomical relation with the ovaries, especially those which have naturally a special sensibility, as the glottis, rectum, &c. Amongst the latter may be enumerated all the various phenomena reviewed in the first part of the analysis, as convulsive cough, hydrophobic gasping, vomiting, neuralgia of the mammæ, sternum, &c.; and in the former, the neuralgia of the scalp and face, the nerves supplying which, are, more than any other, exposed to every variety of irritation in their course to the cerebrum, through the complex and highly developed osseous structures of those parts.

Paralysis.—I shall very briefly notice the phenomena included under this head. The impairment of the external senses will come again under review, and a few general remarks on loss of muscular power will only be necessary. The latter most frequently affects the abdominal muscles and viscera, and the lower extremities, then

the facial nerve and the upper extremities. The senses are also subject to paralysis in different degrees of frequency. Amaurosis is much more frequent than deafness, deafness than loss of taste, and the latter than true anæsthesia.

With reference to functional paralysis, as well as chorea,* tetanus, neuralgiæ, and partial agues, it may be remarked generally, that in females it much more frequently affects the left side than the right. This is in accordance with my previous remarks on the deficient development of the left side organs in the fœtus, and in animals generally. Amaurosis, however, more frequently affects the right eye than the left, so in Case 6 there was a discharge from the right ear, paralysis and pain on the left side. Case 30 is very interesting, from its presenting during a paroxysm a series of phenomena in regular sequence. First, the right side of the body is affected with spasms, and blood flows from the right arm and leg; then general convulsions supervene, and on the cessation of these symptoms, the left side is found in a state of tetanic flexion. It requires no great stretch of imagination to conceive, that the immediate cause of the last symptom was situated on the left half of the cerebro-spinal centre, below the crossing, while the cause of the spasms and flow of blood from the right side was situated in the left hemisphere of the cerebrum or cerebellum above the crossing. It may appear contrary to the general law of retarded or less perfect development occurring to the left symmetrical half of the body, that in the left hemisphere the voluntary powers originate which move the stronger or right half of the body. This is an exception which will lead to some important results. The following inferences may be deduced;—either that the origin of muscular power must be below the crossing, or that the nervous matter immediately subservient to muscular motion does not cross; in short, that while cerebral paralysis commonly depends on lesion of the opposite hemisphere, automatic movements may be excited in one side of the body by lesions in the hemisphere of the same side, which is the fact.† I shall probably revert to this part of the subject.‡

* Edinburgh Medical and Surgical Journal, xlii. 229.

† Müller's Physiology by Baly, p. 842.

‡ I noted 103 cases related or quoted in Dr. Abercrombie's work on Diseases of the Brain and Spinal Cord with the following results:—Males 59, females 34. Disease of right side of cerebrum 37; of both sides, but to greatest extent on the right side, 2; of left side, 29; of both, but most on left side, 7; of both equally, 9. Cerebellum, right lobe, 3; left, 11; right of cerebrum and left of cerebellum, 1; right side of both, 1; both lobes of cerebellum, 4.

Disease of right side of brain,	palsy of left side of body, .	18
	palsy of right side, .	3
	without palsy, . .	13
	with general palsy, .	1
		35

Lateral curvature.—I have already remarked (page 94) that local hysterical paralysis will give rise to distortion of the foot;* it may also induce lateral curvature of the spine. This deformity is ascribed by writers in general to unequal muscular action, and the curve is almost invariably to the right side.† Contrary to the more common opinion, I conceive the muscles of the right side are the strongest; those of the left being affected with partial paralysis, and so rendered unable to assist the greater force of traction to the opposite side. In accordance with this explanation are the facts mentioned illustrative of the greater liability of the left side to disease, the natural curve of health, and the pathological researches of Mr. Shaw, who found the muscles on the convex or right side to be the largest, and the nerves going to those of the concave or left side diminished to less than one-half of their natural size.‡ The treatment, then, which directs shampooning and other local remedies to the right side, as being the weakest, is not only useless, but positively injurious.

Amaurosis.—The optic nerves have a very intimate connection with the two extremities of the cord. Thus, injuries of the facial branches of the fifth will cause amaurosis in the eye on the oppo-

Disease of left hemisphere,	palsy of right side, . .	35
	palsy of left side, . .	1
	with general palsy, . .	1
	without any paralysis, .	8
		45
Disease of one side of brain,	palsy of opposite of the body, .	43
	palsy of same side, .	4
	with general palsy, . .	2
	without palsy of either side,	21
		70

In 11 cases in which the left lobe of cerebellum was diseased, there was paraplegia in 1, paralysis of right side in 2, of left in 1, and no paralysis in 7.

The cases arranged with respect to age, side, and sex.

	Right Hemisphere.		Left Hemisphere.	
Age.	Males.	Females.	Males.	Females.
Under 12, .	3	3	3	2
18, .	3	–	3	2
28, .	3	2	2	3
50, .	10	3	9	7
Above 50, .	5	3	7	1
	24	11	24	15

These numerical results may lead to the salutary conviction of how little we yet know of diseases of the nervous system. The most remarkable fact is, that, in 28 of 81 cases of diseased hemisphere of cerebrum or cerebellum, there was no paralysis; being more than one-third.

* Mr. Shaw in Further observations on the Lateral Curvature of the Spine, p. 182, 8vo., London, 1825, gives a case.

† Mr. Baynton on Diseases of the Spine, p. 42, 8vo., 1813. Mr. Shaw on the Nature and Treatment of Distortion of the Spine, p. 58, 8vo., London, 1823.

‡ Ibid., p. 68. The views of Dr. Stromeyer, who considers paralysis of the respiratory muscles, particularly of the *serratus magnus*, a cause of lateral curvature, are also in accordance. British and Foreign Medical Review, Jan.

site sides to that injured.* Difficult dentition, caries of the teeth, abscesses of the jaws, and salivation, have been mentioned as being frequent causes of this disease.† Derangement of the stomach, diarrhœa, constipation, and excessive indulgence in amatory pleasures are very generally added to the catalogue. Mental emotions, according to most writers, frequently originate amaurosis. Those who are subject to intermittent attacks have the premonitory symptoms common to all paroxysmal nervous diseases. Intermittent ophthalmia or neuralgia is occasionally heptaperiodic.‡ The connection between the optic and respiratory nerves is curious. A strong glare will excite sneezing, and the sensation of light is occasionally the excitant of the respiratory movements.§ The relations of the conjunctivæ have little in common with those of the optic nerve.

Anæthesia.—This in a chronic form, and, alone, is rarely a symptom of hysteria; it is, however, very common in coma, catalepsy, and somnambulism. Various considerations render it exceedingly probable that the sense of touch has a special point of connection with the brain, strictly analogous to that of the other special senses. The faculty of perceiving resistance, and consequently of judging of weight, is seated in the skin, and is dependent on the sense of touch; so that in cases of anæthesia, muscular movements are regulated by the eye. Dr. Elliotson‖ supports a contrary opinion, and cites Brown, Wells, Sir C. Bell, Spurzheim, and Weber, in support of the opinion, that the sense of appreciating weight and resistance is seated in the muscles. The cases of complete anæsthesia recorded by Dr. Yelloly, I think, set the question at rest. In one case the individual, it is stated, "can grasp pretty firmly; but in holding any thing he is apt to drop it, if his attention is at all called away."¶ Of another it is said, "on turning her eyes aside, she often drops glasses, plates, &c., which she holds in safety as long as she looks at them."** According to Weber, if the hands of a blindfolded person be supported on cushions, and unequal weights placed on them, when the difference is great it will be felt; but if it is small, it will not be noticed until the hands are raised,—"till the muscles feel what resistance they have to act against," according to Dr. Elliotson. This is an inaccurate conclusion. Let an individual rest the back of his hand on a cushion, and a weight be placed on his fingers, the pressure of the weight on the skin is diffused while the fingers are at rest; but let the extensors of the

* Travers' Synopsis of Diseases of the Eye, 152.

† Cooper's Surgical Dictionary, article Amaurosis. 6th Edition.

‡ Dr. Bostock's case in Medico-Chirurgical Transactions, iii.; another in Journal Complem. January, 1830.

§ Jüngken (Die Lehre von den Augenkrankheiten) was acquainted with two persons who were instantaneously seized with asphyxia, if light were shut out; or awoke in the night in a state of suffocation if their taper was extinguished. A similar case is mentioned by Laennec. (Forbes' Translation, p. 414.)

‖ Human Physiology, Part ii. p. 527.

¶ Medico-Chirurgical Transactions, iii. 95. ** Ibid., 99.

fingers act, and the weight be raised by a muscular effort, and we have the skin compressed by two powers against the bony prominence of the fingers; the compressing force being that of gravity in the weight, and of muscular contraction in the resisting muscles. The conclusion, then, from Weber's experiments should be, that a small difference in weight was not appreciable, until the pressure on the skin of the fingers was localized and increased by raising the weight. Dr. Wells' remarks do not seem to bear upon the point in any degree. The perceptions of position, perpendicularity, and amount of muscular effort, are analogous to many morbid sensations, as vertigo, feelings of flying, of being lifted up, being lighter than usual, &c.; all which are seated in the encephalon. Besides, it is contrary to all analogy, that a special sense should be located in muscular structures; they are constantly found on mucous membranes. I coincide, therefore, with Sir C. Bell* and Breschet,† who consider that the organ of touch is not a mere nerve, but is a special apparatus placed on the skin, and that the sense of touch is a special sense as much as seeing or hearing. The touch, like the latter senses, guides, and is assisted by muscular effort.

Review of some Anomalous Phenomena.—Under this head I propose to consider various symptoms of hysteria, the existence of which has been denied or is doubtful.

Catalepsy. — In 1683, Laurence Bellini published a quarto volume on various subjects, in which he described catalepsy. Since that period cases of the disease have been continually recorded by various observers; and its existence is now established by the most complete evidence. I shall notice it very briefly. It consists essentially in coma, with an automatic contraction of the muscles when external force is applied to the limbs; that is to say, in whatever position a limb is placed, its muscles contract and maintain that position. Yet in general the contraction is not energetic, for a very slight force will overcome it and the position of the limb be easily altered. In catalepsy the extensors and flexors both act; in sleep and coma the extensors are paralysed, and the automatic contraction of the flexors is so slight that it cannot resist the force of gravity. Automatic contraction of the flexor muscles is a natural quality; the sleeping position of the common fowl illustrates this fact, as well as the contraction of the flexors in paralysed legs; it is most frequently observed in the lower extremities; but the action of the flexors and extensors of the upper extremities appear to be physiologically different. In cases of paralysis of the upper extremity during the waking state, the flexors act and flex the fingers and thumb on the palm; but occasionally on awaking from sleep the patient finds his fingers in a state of tetanic extension. I have observed two instances lately. Now in catalepsy, we have automatic action of both flexors and extensors; so that there is a

* Bridgewater Treatises, iv. The Hand, its mechanism, &c., 2d edit. 178.
† Nouvelles Recherches sur la Structure de la Peau. 1835.

due antagonism established at every change of position, and the position is maintained unless a greater force is applied than the muscular contraction can resist. This muscular contraction will of course vary from almost a tetanic to a paralytic state. A case observed by Mr. Ellis of Dublin* illustrates very well the connection between tetanus and catalepsy. In the common fowl, the flexor action of the muscles of the toes is antagonized by the weight of the body, and probably the proper excitant of this action is pressure on the skin of the foot, as is supposed by Mr. Grainger, to be the excitant of the progressive movements in general.† In brown study, or reverie, the eye is fixed by a muscular action very analogous to the cataleptic. Have not the flexor muscles some special connection with the spinal cord, as supposed by Bellingeri? Tetanic flexion of the fingers and toes is much more frequent than tetanic extension.

What is the state of the nervous system in catalepsy? In an exquisite instance, the functions of the body are performed with the least possible display of vitality. The heart almost ceases to act; the respiratory process seems interrupted; vital heat is diminished, and secretion arrested. The system is in a state of torpor analogous to that of the hybernating animal, and the vital conditions of the two states are probably the same.

The causes of catalepsy need not be enumerated. All violent emotions and depressing agencies, especially if operating on the female at the periods when her natural affectibility is exalted by the generative nisus, poisons, and malaria,‡ will excite the disease. It has also an intimate connection with other diseases of the nervous system, as coma, epilepsy, ecstatic delirium, and somnambulism; each disease occasionally appearing in succession in the same individual. Dr. Prichard particularly notices this fact, and Cases 8, 35, 63, 64, 65, are illustrative.§

Combined or connected movements.—Under this division I propose considering a class of phenomena, in which the muscular system performs a series of involuntary acts without spasmodic action. These may be arranged under five heads.

1. Involuntary combined movements, which are excited or accompanied by a sensation; sneezing with profuse lachrymation, hiccup, yawning.

2. Movements which in health are excited by or accompany a feeling or emotion; laughter, weeping, sobbing, ejulation.

* Lancet, ii. for 1835, p. 129.

† Observations on the Spinal Cord, p. 113, 114, 8vo., 1837.

‡ Sauvages, Nosol. Method, Tom. i. 827. Stoll, Ratio Medendi, pars vi. p. 215. Vien. 1790, and quotes Rondeletius.

§ Others may be found under the following references. Pomme on Hyster. and Hypochon. disorders, by Berkenhout, 4th ed. p. 63. Sauvages, Nosol. Method. i. 825, ii. 207. Van Swieten, apud Boerhaave (from Hollerius), iii. 319. Darwin, Zoonomia, 3d ed. i. 32. Gooch on Diseases of Women. London, 1829, p. 117. Medico-Chirurgical Review, New Series, iv. 201, v. 203, xviii. 207. Medico-Chirurgical Transactions, iv. 17. Medical and Physical Journal, 1828. Annali Univ. di Med. October, 1830.

3. Combined movements in a definite direction, and originating in an impulse; choreal pronation and supination; rotation of the head, or of the whole body; rapid movements forwards, or backwards; inverted perpendicularity, as when the feet and legs are directed upwards.

4. Rhythmical movements; those excited by an involuntary impulse, or by an idea in connection with a measure of tune, mechanical repetition, true chorea.

5. Movements from what has been named a propensity to imitate, comprising most of the preceding. I shall briefly notice all in detail.

Hiccup and sneezing are combined convulsive movements, the former seldom being accompanied by a sensation, in both the respiratory muscles are, however, implicated, as in all those movements comprised under the first and second heads. They have this also in common, that they frequently form part of a common hysterical paroxysm,—ejulation, or the utterance of loud cries, being excepted. This last symptom is occasionally observed in other nervous and convulsive diseases, and in some cases of poisoning; it appears altogether automatic. The movements under the two first heads are also observed to have a periodical occurrence.*

The connection between grief, lachrymation, sobbing, and globus, is well known. In an entry in his journal, soon after the death of Lady Scott, Sir Walter remarks, "I do not know what other folks feel, but with me, the hysterical passion that impels tears, is a terrible violence—a sort of throttling sensation—then succeeded by a state of dreaming stupidity, in which I ask if my poor Charlotte can actually be dead;"—a graphic description of the effects of grief. The relations between the latter and immoderate laughter are not so obvious. Dr. Crichton observes, "that many (I am almost tempted to say most people) now and then have been inclined to laugh when a person has first begun to relate some misfortune. Nay, a more uuaccountable circumstance of this kind is, that many people, when they have to tell us of the death of another person, feel themselves often inclined to laugh at the moment they begin to speak of it;"† and these individuals, he adds, are possessed of fine feelings. I knew two brothers, who had experienced poignant grief from the death of a sister. The day after her interment they walked to her grave, a distance of two or three miles, to indulge their feelings, and on their return were siezed with an irresistible propensity to immoderate and loud laughter, which con-

* Case 50 is by no means a solitary instance of periodic hiccup. Höchstetter and Riedlin relate histories of quotidian yawning in girls; in some, the yawning was so vehement as to luxate both jaws. (?) (Sauvages, op. cit. i. 633.) A case of quotidian laughter is quoted in Medico-Chirurgical Review, New Series, i. 485, from Gaz. de Santè, No. xviii. I think there is an instance of periodic sneezing in a recent volume of the Edin. Med. and Surg. Journ.; Sir B. Brodie relates an instance in which it was heptaperiodic, (Medical Gazette, xix. 249.)

† Inquiry into Mental Derangement, ii. 155.

tinued for some time. I think this kind of laughter is analogous to the perverted feelings of the insane, when love is changed into hate, devotional feelings into the most scornful contempt for religious things, modesty into obscenity, &c. Of this character are the cases (No. 55), quoted from Wesley's Journal, and the gaiety displayed by individuals about to die on the scaffold. Shakspeare has not overlooked the latter:—

> "How oft, when men are at the point of death,
> Have they been merry? which their keepers call
> A lightning before death."
>
> Romeo and Juliet, *Act.* v. *Scene* iii.

In these instances, the mental powers must have suffered from powerful emotions, confinement, and deficient food, however great they may have been previously. The gaiety is perhaps really a morbid state; I do not recollect an historical instance of it, which was not preceded by the depressing agencies mentioned. I think these remarks are of importance, because they point out a set of psychological relations hitherto uninvestigated.

Combined movements in a definite direction.—The instances of this kind may be arranged in two divisions, accordingly as the whole or parts of the body are affected. It may be observed generally of both, that their proximate causes have been for the most part functional in females, and organic in males; just as happens in common chorea. The cases depending on organic diseases need not be noticed, except as pointing out the seat of the affection.

Of seven cases, the details of which I have carefully perused, five occurred to females under puberty.* In one the patient was a highly hysterical female, aged 42, subject to epileptic fits, and the choreal movements were not strictly combined;† in the other,‡ the patient (a female) was aged 23, and had been indisposed with a variety of complaints for seven years, so that the real period of the commencement of her disease was that of puberty. The leaping ague of Angusshire was most common before puberty, that is, between 8 or 9, and 15. This general fact renders the affection analogous to chorea. The paroxysms were accompanied with other nervous affections, as tremors, cephalæa, epilepsy, coma, aphonia, hiccup, ejulation, (Armstrong, Anonymous), &c.; in some consciousness was abolished. Constipation is a symptom common to all except Armstrong's cases. Paroxysms were in general easily excited by slight agitation of mind, and the individuals were exceedingly susceptible of every kind of impression; in one, during

* Dr. Armstrong, Medical Commentaries, ix. 317, anonymous, Edinburgh Medical and Surgical Journal, iii. 434. Mr. Crichton, xxxi. 299. Dr. Watt, Medico-Chirurgical Transactions, Vol. i. Dr. Alexander, Lancet, 1827–8, i. 393.

† Dr. White, Medical Commentaries, iv. 326.

‡ Mr. R. Hunter, Edinburgh Medical and Surgical Journal, xxxiii. 261.

the paroxysm, the very idea of being touched caused a sensation of horror. (Hunter.) Forcible arrest of the movements would excite the fiercest rage. (Watt.) In Mr. Crichton's case, the attack was connected with a fright from the entrance of thieves into the house; during the paroxysms the young lady secreted her trinkets. The most constant affection was some derangement of speech. The leaping ague was thought hereditary. With regard to the particular set of movements, no one seems peculiar to a special state. In Dr. Watt's case, vertical and lateral rotation and inverted perpendicularity were observed in succession, an apparently inverted sense of relation to the plane of the horizon preceding the latter. In the Angusshire ague, if the progressive movements were prevented, the patients would leap upwards, and rotate round the rafters of the house with a motion resembling that of the fly of a jack. (Sinclair.) Retrograde movements were not observed in any of these cases, and the only one I have read of is that mentioned by Magendie,* as having been shown to him, and at the Royal Academie of Medicine, by Dr. Laurent; the patient was a hysterical female. If we trace out the analogical relations of these affections, their singularity is in some degree diminished. Dr. Elliotson remarks,† that vertigo frequently attends them, whatever be their variety; and very justly adds, that vertigo cannot be their cause. It however appears to be a sensation, (that of turning round,) originating in the same parts as do the rotatory movements. Let an individual revolve from twelve to twenty times on as small a circle as possible, and he will find on ceasing that, conjoined with the vertigo excited, there is a propensity to rotate, by which he will be irresistibly compelled to perform one, two, or three additional revolutions; so that the temporary state of the encephalon under these circumstances probably resembles that of the rotatory paroxysm. Waltzing in a small room causes the same phenomena. The propensity to move forwards has its analogy in the disease which sometimes affects hardly-worked horses. When walking twelve or fourteen miles at full stretch, I have first experienced great fatigue, and then an urgent desire to move forwards in a straight line; so that anything which has compelled me to stop a moment, or to deviate, has caused a painful sensation.

In Dr. Watt's case, the patient rested on her occiput, and, raising her feet to the roof of the bed, let them fall again, and this she repeated twelve or fifteen times a minute for fifteen hours in succession. This inverted perpendicularity is analogous to a sensation perceived after sleep, as if the feet were placed where the head ought to be, which is sometimes followed by attempts to rectify the supposed improper position. It is almost peculiar to children on waking. I have occasionally experienced it, and nothing short of complete consciousness ever removed the feeling.

* Elem. Comp. of Physiology, trans. by Milligan, 4th edition, 191.
† Human Physiology, 5th edition, p. 430.

Great facility in balancing the body, (Sinclair, Crichton,) or in climbing (ibid.), as leaping upon and sitting on the top of a door, or running round the edge of a table, have been observed in cases of somnambulism, as well as in these.* Something analogous is the impulse to place the centre of each foot, when walking, precisely on the line of junction of each flag on the flagged way, or of each brick or board on floors, experienced by some individuals. They may be easily known in the streets by the position of their head, and their strides of unequal length. The darting of the finger at a given point (Case 61,) &c., are phenomena of the same class.

The sensation of the body being lighter than usual, perhaps depends on a sense of diminished muscular effort combined with some degree of anæsthesia. After closer reading than usual I have felt on lying down, as if I was floating buoyantly down a stream. The same sensations have been induced by camphor.† John Hunter, after much mental anxiety, experienced a feeling of being suspended in the air, of his body being much diminished in size, and of every motion of the head and limbs, however slight, being both very extensive, and accomplished with great rapidity.‡ If these sensations had been a little more intense, probably rapid combined movements would have followed. I conceive that the whole of this class of motions and sensations originates in the same central parts of the nervous system. Pathological anatomy, and the experiments of Rolando, Flourens, and Magendie, have thrown considerable light on the subject.‡

In some cases the combined movements consists in a regular and rapid flexion and extension, and pronation and supination, so that the parts of the central nervous system affected are in some way connected with muscular antagonism.

Mechanical repetition; rhythmical movements.—The consideration of these is but a step higher in a continuous chain of phenomena. We have traced infantile convulsions to common choreal jactitation, the latter into the combined movements just investigated, and the latter, it may now be observed, are generally connected with rhythmical chorea, or with combined movements repeated mechanically. In Case 61, flexion and extension, pronation and supination, *malleatio*, propensity to leap upwards, and true rhythmical chorea appeared in succession in the same individual. The same phenomena are here observed somewhat more complicated by being in relation with a measure of time.

As it would be, therefore, impossible to do justice here to this subject, I shall make a few general remarks only. An impulse to

* Dr. Elliotson has collected a number of interesting examples of somnambulism, those at p. 643, sqq. of his Human Physiology, 5th ed. are illustrative of these forms of chorea.

† Orfila Toxicol. Gen. ii. 406.

‡ Life, in Works by Palmer, Vol. i., p. 62.

§ Magendie, op. cit., loc. cit. Elliotson, op. et. loc. cit.

rhythmical movement is common to man with many animals. It may be observed in birds. Dogs and horses will trot in the most regular time. Children delight in measured movements, as may be observed daily in their sports, or when congregated round the hurdy-gurdy. The conductors of infant schools have made this circumstance extensively available for the purposes of instruction, as any one may see by attending them. I observe few individuals can walk out of time when a street organ is grinding a suitable tune in their hearing. The propensity to mechanical repetition excites the simplest of rhythmical movements. A good illustration is presented by the awkward practices in which some people involuntarily indulge of wagging one leg across the other, drumming with their fingers, (but not to a tune,) hitching up a shoulder, drawing their hand across their chin as if for the purpose of ascertaining whether the beard be growing. Any one who will take the trouble to time the movements of these social gadflies, will find that they are done at distances of time precisely equal. People in general are not aware how rhythmical our actions are. Darwin has shown that verses may be divided into the bars of triple or common time.* The same observation may be applied to the prose composition of many writers; Johnson's sonorous stately style is an instance. Darwin remarks "some prose has its melody and even measure."† Most public speakers talk and gesticulate rhythmically, and also individuals in animated discourse. Every form of muscular movement may be repeated mechanically. (Cases 59, 61.) The tic-tac sounds (Case 60) probably originated primarily from the patients having been constantly in the room with a loudly ticking clock or time-piece; it is analogous to a "tune dwelling on the mind," (Case 61,) and to the secretiveness manifested during a paroxysm by Mr. Crichton's patient who was frightened by thieves. People who have heard a pleasing air at a concert will be constantly humming it for weeks after.

Tarantism.—I have shown already that animal, mineral, and vegetable poisons, will give rise to many of the phenomena of hysteria; and in this disease we have an additional illustration of the fact, the poison of certain arachnidæ having the effect of exciting a propensity to choreal movements, dislike of colours, &c. Case 62 is by no means a solitary instance, as is evidenced by the history of the *tarantati.* Just as arsenic, belladonna, and other poisons, produce various symptoms, according as the dose, the individual's idiosyncrasy, or other circumstances vary, so also does the poison of the tarantula; it does not necessarily excite true chorea, no more than arsenic necessarily excites vomiting. A young Tuscan, aged 15, was bit on the second toe of the left foot by a tarantula. The toe inflamed, the patient's penis became erect, the abdominal muscles assumed a state of tetanic contraction, the extremities were convulsed, the countenance had an expression of

* Loves of the Plants, Interlude iii. † Ibid., Interlude i.

terror, the skin was cold and moist, the strength prostrated, and there was an irresistible tendency to sleep. The patient was cured by stimulants.* These symptoms, with one or two exceptions, are common to several animal poisons. No mention is made of the state of the throat, which is generally the part in which uneasy sensations are first felt in these cases. It cannot be denied that numerous errors are mixed with the medical histories of the effects resulting from the bite of the tarantula. But Baglivi's essay† on the subject appears to me to possess the same cautious philosophical character as his other works. He remarks, that the symptoms of tarantism are remarkably analogous to those of melancholia, chlorosis, and similar diseases (Cap. i.). He shows that the Tuscans are "macilenti, impatientes, iracundi, insomnes," &c. (Cap. ii.) That the tarantula produces its most remarkable effects during the hottest days of summer; that only those which are in the burning plains are poisonous; that if it be removed to a colder climate it becomes harmless (Cap. v.); that different species of the insect produce different symptoms (Cap. vi.); that the bite of the scorpion produced the same effects, and consequently, that tarantism was ascribed to it by the old Greek writers and the vulgar. (Cap. vii.) The *tarantati* are usually females (Cap. vii.). If the patient does not dance but recovers, the disease returns the next year, and he is affected with yellowness of skin, febricula, loss of appetite, oppression at the epigastrium, &c.; and if he eat mutton, cucumber, or melon, he is immediately seized with a sharp pain of the stomach. (Cap. vii.) Baglivi made a tarantula bite a small dog on the lip; the dog died comatose on the fifth day. The symptoms first observed are those of a malignant fever (cum coagulatione); there are sense of strangulation, and an almost fatal depression of the vital powers; suffocation seems impending; the lips and cheeks are livid (Cap. vii.); the wound is surrounded with a livid circle; there are numbness and tremors of the limbs, or great sensibility of the surface; aphonia and spasm of the tongue (Cap. xi.). The bite of the *Uvea tarantula* is followed by pain and swelling of the bitten part; spasms, rigors, and general cold sweats; aphonia; frequent vomiting; dyspnœa, and sense of impending suffocation; tympanitis and erection of the penis, with the other symptoms just mentioned. (Cap. vi.) In all these statements there is nothing marvellous.

Then, with regard to the rhythmical chorea, it appears that the patients do not show the propensity to dance unless music be played in their hearing, and then each patient must hear his own favourite tune; so that the musicians have sometimes to play three or four tunes before any effect is produced. Rapid tunes are the most enlivening to them (Cap. x.), as they are, I suppose, to most dancers. The effect of the music is first to mitigate the symptoms;

* From Osservatore Medico in Lancet, Vol. ix., p. 129.

† Disertatio de Anatome, morsu et effectibus Tarantulæ, in Op. omnib. Lugdun. Batav. 4to., 1733.

the patient then moves his fingers, next his hands, feet, and legs, and at last leaping up, begins to dance, which he continues to do for a length of time without weariness. A slight discord (of which country clowns, previously quite ignorant of music, become very susceptible) will excite constriction of the chest, gasping, and sobbing. The sight of any thing black will have the same effect; but that of naked swords, or of scarlet, red, and blue, gives them pleasure (Cap. ix.). Sometimes the patients show symptoms of nymphomania, or run forwards, or revolve on the ground (Cap. vi.), appear to be intoxicated, or as if they had lost the use of their senses; they do not notice their friends, &c. (Cap. ix.)

I do not see anything so very marvellous in these symptoms. They are, in fact, quite analogous to many hysterical and toxicological phenomena. We have the heart and respiratory system being paralysed by a poison, just as occurs after a large dose of opium. The affectibility of parts of the nervous system is exalted by the same agency; and the proneness to rhythmical movements is analogous to the increased susceptibility of the effects of certain colours. It is readily excited into action by suitable music; and dancing, by keeping up the action of the heart and vascular system until the poison is eliminated, does that for the tarantati which the muscular movements excited by nettles and stripes effect for the narcotized. I think this means of cure might be made applicable to other cases of poisoning, as by the bites of venomous reptiles, and by some vegetable poisons, particularly belladonna and stramonium. It would be of importance to commence the treatment early, to select a favourite air, and to have it performed in quick time on an instrument connected with old or familiar associations, as the bagpipes, fiddle, or drum.

The inhalation of vapour of ether excites gay delirium. Nitrous oxide excites laughter and beautiful dancing, but a disposition to fight, also, in some individuals of pugnacious propensities. I have witnessed both effects in the Chemical Theatre of London University College.

Endemic Chorea.—Sauvages gives instances of chorea being endemic in Africa and various parts of Germany.* The leaping-ague of Angusshire is probably of the same character.

Imitated Movements.—All these various movements may be imitated. An individual yawns, and all around him yawn; one wags his leg, and his neighbour's wags too. Of fifteen men I observed seated on a bench at a public sale, six were performing mechanical or rhythmical movements. M. Chevreul wished to know whether it was true, as he had been informed, that a pendulum formed of a heavy body and flexible cord, oscillated when held over a certain body, although the hand be not moved. In a letter to M. Ampère, he states, that he found, when his eye followed the oscillating pendulum, he felt a sensation of a tendency to motion, which was

* Nosol. ii. 231, sqq.

satisfied in proportion as the pendulum described larger arcs. When his eyes were bandaged, the oscillations were very feeble.* This is the simplest form of imitated movements. Those complicated with emotions are somewhat different. For the due development of these there must be a predisposing state of the system; and this may be either natural, developed, or excited. It is natural to females and children, and constitutes the affectibility which I have already illustrated. It may be exalted or developed in males by all depressing agencies, and excited in both males and females by emotions. The orator who weeps or laments with the purpose of infecting his hearers, first prepares them by certain emotions. If a stranger came to hear his harangue at the moment his tears were falling, the former would consider him very probably rather an object for ridicule than imitation. The infectious mirth of the social is very analogous. Let an individual join a laughing party, and he will think or say, a very little wit makes fun for them, and will scarcely relax his features. The convulsions of popular assemblies are not strictly imitative, since the affectible state, originating in mental emotion, must precede their accession.

Exaltation of the Mental Faculties.—It appears from the preceding remarks, that these variously combined movements originate in a morbid excitability of the natural faculties by which they are guided, which itself forms but a part of one general symptom,—a morbid affectibility. I shall not here consider the whole series of the psychological phenomena of hysteria, but shall merely notice those which are or appear anomalous.

Exalted Sense of Touch.—In connection with this there are only two faculties to be noticed, namely, of distinguishing individuals and colours by the touch.

The perfection to which the sense of touch may be brought by the blind is exceedingly illustrative of these various phenomena. Julia Brace is an inmate of the Deaf and Dumb Asylum at Hartford, United States, and is deaf, dumb, and blind. She recognises the various inmates of the house by the touch and smell, and can distinguish a silver spoon among 120 of baser metal.† Casper Hauser's senses were all morbidly exalted; he could distinguish metals by the touch through paper and even oil-cloth.‡ There are differences in individuals not appreciable by our senses but distinctly so by inferior animals. In certain fevers, and in cholera, the touch of the patient excites a sensation very similar to an electric shock,§ or that experienced by Hauser when touching metals; so that the recognition of individuals by the touch is clearly within the bounds of possibility. The perception of colours by the touch, remarked in

* Lond. Med. Gaz. xii. 830; and Dublin Jour. iv. 141. This is a very interesting paper on some muscular movements.

† Journal of a Tour through the United States, by E. S. Abdy, Fellow of Jesus College, Cambridge, 3 vols. 12mo., 1835, Vol. i. 229–230.

‡ Dublin Journal, v. 150.

§ Dr. Grieve, in London Medical Gazette, xiii. p. 593.

some hysterical cases, (62,) is a faculty which has been repeatedly attributed to the blind. A very respectable medical gentleman has mentioned to me an instance of this kind which came under his own observation. It is not impossible that each colour may be connected with some molecular organization peculiar to itself, and perceptible by an acute touch. It is not a little remarkable that in Cheselden's oft quoted case of cataract, the first visual perceptions were imagined to be those of touch. To suppose, however, that the usual aids to vision, as convex glasses, can aid the touch, (as asserted in Miss Macavoy's case,) is absurd.*

Can a somnambulist see with his eyes shut? This feat is not impossible; but the assertion that there may be sight without eyes, or hearing without suitable apparatus, is incredible. There is, I believe, not a single instance of anything of the kind throughout the whole animal series. Most acute vision in the dark is not uncommon. Animals which prey by night see well in comparative darkness. Casper Hauser, could "read after sunset the number of a house at the distance of 180 paces, which in daylight he would not have been able to distinguish so far off. It was proved by experiments carefully made, that in a perfectly dark night he could distinguish different dark colours, such as blue and green from each other."† The vision is rendered very acute by disease. Dr. Bostock, while suffering from a remittent ophthalmia, could see the chairs and tables in a room in which other people had to grope their way.‡ The committee appointed by the Royal Academy of Medicine, to investigate Mesmeric phenomena, report of an individual who read while in Mesmeric somnambulism with closed eyes. "We remarked that the ball of the eye was in a constant rotatory motion, and seemed directed towards the object presented to his vision;" a very plain proof that the optic nerves carried the impressions to his brain, and not those of the skin covering his finger ends or epigastrium, and affording ground for a suspicion that imposition was practised.§ Somnambulists are said to read with their eyes even when firmly shut and bandaged.‖

* The individual alluded to above could distinguish the colours of cattle by the touch; but all these instances must be received with great caution. A gentleman, resident near York, who is utterly blind, is very generally supposed to be able to distinguish, by the touch, the colour of flowers, of which he is an amateur cultivator, and has great pleasure in showing to his friends. Medical and other friends, upon whose powers of observation every reliance might be placed, have positively assured me of the fact; yet I learn from the individual himself that it is a vulgar error. He informs me that he can readily distinguish the form of the flower, and from thence infers the colour. He thinks that the colour of dyed cloths might easily be ascertained from a difference caused in the smoothness of the wool by the dye.

† Dublin Journal, v. 147–148.

‡ Medico-Chirurgical Transactions, iii.

§ Isis Revelata, ii. 333. From this and later statements of the same kind, there seems reason to doubt all facts of this most extraordinary and unaccountable description.

‖ See cases quoted by Dr. Elliotson. Human Physiology, 5th ed. p. 652.

Painful and agreeable perception of Colour.—This is a symptom more common in disease than is usually supposed. It is occasionally the most prominent symptom in hysteria. The pleasurable perception of colour is one of the earliest phenomena of infancy. I am gratified by looking on a bright red or scarlet, or a gorgeous purple. The sight of a beautiful autumnal sunset affords me greater pleasure than musical sounds or sweet flavours; the sensation is analogous to that excited by the smell of a hyacinth. Lower animals have a painful and pleasurable perception of colours. Mackerel are caught by a bait of red cloth;* perch by bread coloured with red lead. A military friend informs me that the green snake of India will dart from the trees at the brass on the soldiers' caps, especially when glittering in the sun, as happens during a march. Scarlet or red is particularly obnoxious to bulls, vicious cows, turkey-cocks, and occasionally to horses. Vegetables thrive better in red or orange rays than in any other.† In hysteria, certain colours produce pleasure and pain, and evidently according to some general law. Dr. Parry knew a lady who could not endure to look at anything of a scarlet colour.‡ Dr. Elliotson had a patient who was made so thirsty by being put into a ward full of red curtains, that she drank seven quarts in one day.§ In entasia lyssa the sight of vivid colours excites gasp; in tarantism black produces the same effect; in Case 62, white and black caused pain; black, white, or yellow, were offensive to Dr. Elliotson's patient.‖ Dr. Parry knew a lady who could bear no light colour whatever, and whenever he visited her in white stockings he was presented with a black silk apron to cover them, so that black was not disagreeable.¶ Blue and green were agreeable to this lady, and also to Dr. Elliotson's patient. Case 62 exhibited convulsive unnatural laughter at the sight of green or red; blue and red pleased the tarantati; Dr. Elliotson's Mesmerized patient, O'Key, noticed particularly the "nice tidy" gentleman who wore white trowsers.**

There cannot be a doubt that these various sensations depend upon changes excited in the brain and nerves by the physical action of colours; and it appears equally certain that the perception of colour is a special sense. An individual may have acute vision, and not know one colour from another. I have known such an one. It may be observed, that, as colours have a species of antagonism in exciting pleasure and pain, so they have in other respects. After the eye has been long fixed upon a green surface, the colour appears dull and gray, but the eye becomes more susceptible of red rays, and views them with relief and pleasure; and if the

* Yarrell's British Fishes, Vol. i., p. 128, and hence a proverbial expression, "women and mackerel are caught by red."

† Dublin Journal, iii. 126.

‡ Cases of Tetanus, &c., p. 108.

§ Clinical Lectures in Medical Gazette, viii. 381.

‖ Ibid. ¶ Op. cit.

** The Lancet, 1837–8, ii. 282.

eye have been long accustomed to the red, it becomes more susceptible of the green rays. The same relations exists between yellow and violet, and blue and orange.* Precisely analogous are the phenomena of accidental or complementary colours. The accidental colour of any particular colour is the colour exactly opposite to it, if the colours of the prismatic spectrum be arranged in a circle. A bluish-green is the accidental colour of red; a violet-red that of green. When the colour and its accidental are mixed together, white rays are produced. Sir David Brewster has mentioned an ingenious theory† in explanation, which is incomplete, because it does not explain why some individuals cannot perceive the difference of certain colours. Upon inquiry it will be found that they cannot distinguish the accidental colour from the true colour. This is obviously true with respect to red and green, and the apparent exceptions are influenced by the same general law. The person described by Dr. Nicholl‡ called green, red. Dugald Stewart could see no difference in colour between the fruit and leaves of the Siberian crab-tree. To Mr. Harris, shoemaker of Allanby, the fruit and leaves of the cherry-tree had the same colour. Mr. Scott mistook full-red for a full-green.§ Mr. L. the individual with whom I was acquainted, called green, red. It is curious, that in cases of poisoning by henbane, objects have appeared to the patients of a scarlet colour,‖ and that in some states of the nervous system green appears red, or green spectral spots are seen before the eyes.

Other physical phenomena of light are under the same general law as regards the physiological action of colours, particularly those of dichroism. Crystals of potash and muriate of palladium are of a deep-red colour along the axis, and of a vivid green in a transverse direction. Mr. Herschel observed a variety of suboxy-sulphate of iron to be of deep blood-red colour along the axis, and of a light-green perpendicular to the axis.¶ Analogous are the scarlet and green tints of the plumage of tropical birds. The two ends of the spectrum antagonize, also, as respects their illuminating, heating, magnetic, and chemical action,** and their effect on the vitality of vegetables.†† The most curious analogy with respect to the pleasure and pain produced by colour, is that first noticed by Sir I. Newton, between the seven musical notes of the gamut and the primary colours.‡‡ He found that the latter are proportional to

* Dr. Darwin on Ocular Spectra, Philosophical Transactions, Vol. lxxvi.—Professor Muller, Physiology by Baly, p. 60.

† Treatise on Optics, being Vol. xix. of Lardner's Cabinet Cyclopædia, p. 305. This chapter on Accidental Colours is very interesting.

‡ Medico-Chirurgical Transactions, vii. 477.

§ Sir David Brewster, op. cit. p. 311.

‖ Beck's Medical Jurisprudence, 5th edition, p. 883.

¶ Treatise on Optics, p. 249. See also p. 184, for analogous facts in the action of doubly refracting crystals.

** Treatise on Optics, p. 88, and sqq.

†† Dublin Journal, iii. 126.

‡‡ Optics, Book i. Part ii. Prop. 3, 6.

the former, or to the intervals of the eight sounds contained in an octave, or as follows:

Sol.	La.	Fa.	Sol.	La.	Mi.	Fa.	Sol.
Red.	Orange.	Yellow.	Green.	Blue.	Indigo.	Violet.	
1	1	1	1	1	1	1	
9	16	16	9	16	16	9	

Dr. Darwin argues from these facts, and the phenomena of ocular spectra, that the same laws must govern the sensations of both colours and sounds.* In acoustics, every fundamental sound is accompanied by its harmonic sound; and the same term has been applied in painting to the accidental or complementary colours in the primitive colours, because they harmonize with each other. We can perceive an analogy in the sensations excited by certain sounds and colours. Scarlet has been compared to trumpet notes; and deep-blue or gorgeous purple is to me like soft, deep, base chords, such as are heard in some part of Der Freischutz.

From various considerations, I am inclined to think the general laws, of which we have here only a glimpse, govern others of our sensations, as of smoothness, softness, form, &c. Those versed in optics and acoustics would be able to cultivate this hitherto untrodden field with the most delightful success. An agreeable mixture of the shades of accidental and primitive colours might be called a chord; and a series of such, as in a painting, a harmony, &c.

Painful and agreeable perception of Sounds.—Sensibility of sound in general is analogous to sensibility to light. Various sounds, however, will, like colours, excite pleasure or pain. The painful sensation in the teeth, orginating in very acute tones, commonly called the teeth being on edge, is an instance.

No observations have been made sufficiently precise to illustrate this subject. Sounds must be distinguished from noises. Ideas may be excited by noises, which will react on the system, or part of it. The noise of water dropping excites the idea of water, and this will cause the hydrophobic gasp.

Exalted Sensibility to Musical Sounds.—The faculty which originates this system is compounded of two simpler, namely, those which measure the time and the harmony of sounds. I think these have occasionally been confounded. An individual may keep excellent time, and have no ear for music. He probably confounds the fundamental and harmonic sounds, just as individuals see no difference between the harmonic or complementary and primitive colours. Baglivi states, that the tarantati are very susceptible of discords. A propensity to sing is a symptom in many cases of hysteria, mania, and poisoning. In hysterical somnambulism, a musical talent is occasionally developed during the paroxysm,†

* Philosophical Transactions, Vol. lxxvi.

† Dr. Abercrombie in his work on the Intellectual Powers, (4th edition, p. 294,) relates a remarkable instance.

The same has been observed in Mesmeric delirium.* The power of composing poetry and music developed in the insane, (especially females,) and occasionally during sleep,—the quotation of poetic fragments by the hysterical,—"capping rhymes," and other analogeous phenomena, belong to this head.

Exalted faculty of perceiving the lapse of Time.—I merely refer to this obscure subject for the purpose of noticing a phenomenon observed in Mesmeric and normal somnambulism. Individuals under the influence of Mesmerism have been found able to name the hour when a watch was placed to the nucha or epigastrium, under such circumstances that they could not have seen it. The solar plexus and sympathetic system have been dragged in to explain this and other circumstances. Independently of the impenetrable obscurity which must envelope any theory in connection with these structures, such appears to be unnecessary, at least so far as regards the watch experiment. People know what hour it is when asleep, without watch or clock near them. I have fixed an hour over-night at which to awake in the morning, and I have more than once awoke within two minutes, and frequently within five minutes of the hour fixed. This has not occurred from habit, because I have awoke at three o'clock when my waking hour was seven. My experience in this respect corresponds to that of other individuals. For myself I can state, that I am utterly unconscious of any mental effort during sleep; and I have awoke at the hour at once, from what has appeared to me a most profound slumber. Various circumstances, I find, will modify the results. Intense anxiety to awake at the hour makes me anticipate it, and awake much earlier. Great mental or bodily fatigue, as might be expected, causes sleep to be prolonged beyond the hour. A plausible explanation of this mental power may be attempted, but its existence cannot be denied; and if we may arrive at a consciousness of the precise hour when apparently in the most profound slumber, there can be no reason for denying the possibility of its existence in the somnambulist. Some paroxysmal diseases will recur at the same hour most precisely. This occurred in Dr. Watt's case of chorea.

Erratic Secretion.—The reader will be able to form his own opinion respecting the cases of erratic secretion of urine recorded in p. 3. A highly respected medical friend assures me, that he arose from their perusal with the conviction that vomiting of urine was impossible. This opinion is worthy of notice, because it is calculated to stop all inquiry, and is contrary to those of physiological writers of repute, as Haller, Elliotson, Alison, and Müller. It is first asserted, that no well authenticated instance has yet been observed; and when cases 5, 7, 8, and 13, are referred to, we are assured that hysterical females will feign anything, and that well authenticated instances of deception more marvellous than these are on record. I certainly

* Dr. Elliotson's patient O'Key, Lancet, 1837–38, ii. 282, and another, Human Physiology, p. 630.

agree with the latter part of the opinion; indeed, so marvellous are they, that to me they appear utterly incredible, and to require a very great love of the marvellous and considerable credulity to insure a due belief in their truth. Some of them, when considered as cases of disease, are intelligible enough. Let the most wonderful case of Phineas Adams, a youth aged 18, who was lodged in jail for desertion, be viewed as a case of *catochus* induced by fright, and we can at once understand how thrusting snuff up his nostrils, and under his finger-nails excited no signs of sensibility; and how, that during the operation of scalping, he uttered only a groan when the bare cranium was scraped.* Bonetus relates the case of a deserter (George Grogratzi), who was apprehended while making merry in an alehouse. He was so terrified that he gave a loud shriek, and immediately became speechless. When brought to a court martial, he became immoveable as a statue, and appeared unconscious of everything which was going forward.† Phineas Adams was fortunately fed with wine and eggs when insensible; not so this poor fellow, for he died in twenty days, during which time he took no kind of nourishment. Dr. Fitzpatrick‡ relates an instance of cataleptic *catochus* in a female, who was laid out for dead with the usual parade, such as lighting a candles, tying her feet together, &c., of all which she was quite conscious, but could not move a muscle. Dr. Fitzpatrick tried a variety of stimulants without success; but assures us that he at last made his patient wince by introducing some aqua fortis and oil of vitriol into her nostrils; and that, by perseverance in a stimulant plan of treatment, in two hours she was enabled to open her eyes. This is not a solitary intance. No wonder Adams groaned when his cranium was skinned. It is inferred that this youth was feigning, because he was at work two days after his discharge; but we may conclude with equal justice, that the joy excited by his return home, and escape from scalping and from death as a deserter, acted as a remedial agent. It is painful to observe, that in a few instances in which the reported malingerers confessed the imposture, the confessions have a strong resemblance to those extorted from the victims of the Inquisition. Few men, when suffering under real disease, and cruelly tortured as impostors, would hesitate to criminate themselves, if by so doing they could at once escape a hated service and the remedial treatment.

It is true that in hysteria we are peculiarly liable to be imposed upon.

If, however, we examine into the question of erratic urinary discharge as a matter of fact, the proof that it has occurred is ren-

* Edinburgh Annual Register, Vol. iv., Part ii., p. 159; and Beck's Medical Jurisprudence, 5th ed. p. 18. Scraping the cranium causes a peculiarly painful sensation, which vibrates through the whole body.

† Medic. Septentrion. Lib. i. Sect. xvi. Cap. vi., quoted by Dr. Crichton in op. cit. ii. 264.

‡ Med. Comment. x. 262.

dered as complete as possible by the following table of recorded instances.

	Vomit.	Stool.	Ears.	Eyes.	Saliva.	Nose.	Mammæ.	Navel.	Skin.	Tot.
In cases in the selection,	19	2	2	1	0	2	3	5	5	39
In cases from authors,	14	18	2	3	5	1	1	29	12	85
Total,	33	20	4	4	5	3	4	34	17	124

Cases are omitted under the head "stool" in which there was a known communication between the rectum and bladder! in two of the number given it was ascertained that no such communication existed.* The numbers in which the discharge took place from the umbilicus are not very precise. But if we suppose, that in the whole of the cases under the heads of stool and navel, there was a direct communication with the bladder, ureters, or kidneys, we have still 70 instances to account for;—were they all feigned?

Haller thought that almost all secretions may, under the influence of disease, be formed by each and every secreting organ, an opinion which I think will be found to be consistent with facts.† Müller denies its correctness; true vicarious secretion of milk, for example, he observes, never occurs.‡ "The *excretions*, those matters which exist ready formed in the blood, and of which urea is an example, can alone, after the destruction of the excreting organ, be eliminated from the vessels in all parts of the body by the process of exudation."§ If this be a correct statement of the fact, the erratic urine would necessarily permeate the muscles and cellular tissue; no such case, however, is recorded; urinous effusions into the ventricles of the brain and cavity of the peritoneum have occasionally been observed, but these are free surfaces. The urea excreted by exudation from free mucous surfaces must necessarily be mixed with the proper secretions of those surfaces, and there might or might not be the urinary salts and colouring matter. Yet we find in some cases a fluid was vomited, resembling common urine even to the nebula. (Case 7.) Schenck relates the case of Prince Severinus, of Saxony, who had suppression of urine, and who "sex aut octo horis priusquam animam ageret, urinam meram colore et odore, cuivis astante facile agnitam, evomuit." After death a fluid like the urine of dropsical patients oozed from the skin.‖ I think this history a little doubtful; it happened 300 years ago, when princes were occasionally poisoned. The following is, however, conclusive. A female died at the age of 14, who had

* Acta Helvetica, Tom. i. Bonetus Sepulchret, Sect. 24. Obs. vi. § i. Vide Morgagni, Epist. xiii. Sect. 46.

† Elementa Physiolog. ii. 369.

‡ Manual of Physiology, translated by Dr. Baily, p. 475.

§ Ibid. 431. I think no one so well fitted to give an opinion on this subject as Professor Müller; his researches into the minute anatomy of mucous structures are most important and invaluable, and it is consequently with considerable hesitation that I have ventured to express my dissent from his opinions.

‖ Lib. iii. Obs. 199.

from birth a continual discharge from the navel of a liquid resembling urine. On examining the corpse, the anus was large, and occupied the place of the vagina; the umbilicus was on the *mons*, the urachus terminated insensibly on the integuments, was very long and of unusual size; the umbilical vein was large, and the kidneys, ureters, and bladder, were absent. The cause of death was gangrene of the liver, and suppuration of the pancreas.* The discharge from the umbilicus in this case was something more than simple exudation, and can only be considered as an excretion of urine from the urachus instead of the kidneys.

An extended history of secretion would amply confirm Haller's opinion. This, however, would be nothing less than a history of mucous membranes, which would comprise the facts regarding them in natural history, embryology, human and comparative anatomy, physiology, and pathology; and those which afford evidence, that there is some central part of the nervous system which constitutes a common centre of mucous structures.

I shall defer stating the inferences which may be drawn from the whole of the preceding statements, until I enter upon the last division of my analysis; and would only add, that I reserve to myself the right of abandoning, without prejudice to my argument, any opinions I have ventured upon, if more general facts prove their incorrectness.

[It may be interesting to the readers of Case 1 (p. 3,) to be informed, that H. O. lately returned to the Hospital and attempted to pass herself off as her sister, and when charged with the imposition most positively denied that she was the H. O. She was kept in the hospital three or four days until her mother came for her. I think it impossible to meet with a better marked instance of monomaniacal cunning.]

CHAPTER V.

Phenomena of hysteria in which consciousness is involved—Speculations on the nature of mind.—Phenomena of life—Apparatus for functional display—Consciousness—encephalon the organ of—Nervous system—its functions—Attention—Coma—Spectral illusions—Somnambulism—Hysteric cunning—Mesmerism—Nature and seat of the diseases before mentioned—Functions of the cerebellum.

1. The phenomena of hysteria remaining for review are those in which consciousness is directly involved; namely, coma, delirium, spectral illusions, and somnambulism. Before I can enter fully into their consideration, it will be necessary to make some preliminary

* Dr. Moulon, in Journal des Progrès, quoted in Lond. Med. Gaz. i. 710, 1828.

remarks on the nature of consciousness; and as these cannot but have a continual reference to the functions of the nervous system, and as also it will be necessary to review some points in the physiology of the latter, previously to instituting such a general summary of facts and inferences as may lead us to some more precise information respecting the nature and seat of those diseases I have been investigating, I think it will be better to commence this review at once, and conduct it with a special regard to the objects to be attained.

2. As, in the course of this inquiry, I shall unavoidably be led into various unsatisfactory hypotheses and speculations, I must, at the outset, solicit the indulgence of the reader, and request that he will peruse them in the same feeling with which they are written; namely, an anxious desire to ascertain the causes and relations of the various phenomena displayed in health and disease. With such a feeling he will be much more careful to ascertain the amount of truth than of error contained in them.

3. Perhaps no one subject has engaged the attention of man so much as the nature of his own mind; and, consequently, upon no other subject has so much been said and written. It would be altogether foreign to my plan to review the various theories which have been adduced respecting life, organization, the nature of the Deity, and a future state. They may, however, be cursorily noticed, and made available in limiting the points of inquiry to what is really useful.

4. Nothing strikes the mind so forcibly after a perusal of these various theories, as the similarity of all, whether they be those extant at an era long antecedent to the earliest Grecian, as recorded in oriental literature,—the profound disquisitions of Pythagoras, Plato, and Aristotle, the metaphysical commentaries of the hypotheses of the moderns, founded on gravitating, electric, magnetic, and attractive and repulsive forces—they all present more or less prominently three essentials, namely, intelligence, force, and inert matter.

5. These essentials, under various guises, have also entered into the popular metaphysics of every age. The early Greek writers derived their opinions from the east; and the moderns are equally indebted to the same source through the Holy Scriptures, the language of which is imbued with the philosophy of the eras at which they were severally written. St. Paul, in that celebrated passage in his sermon to the Athenians, "For in Him we live, and move, and have our being; as certain also of your own poets have said," embodied the essence of the Platonic philosophy; the true meaning of the passage in the original being, that from the supreme mind or intelligence, or universal soul, we derive consciousness, force, and animal life.* So Aristotle in his treatise Περὶ Κοσμου, writing of the cause which keeps the universe together, observes,

* Ἐν αὐτῳ γαρ ζωμεν, και κινουμεθα, και ἐσμεν: Του γαρ και γενος ἐσμεν.

that, according to an ancient tradition which has been transmitted to every tribe of the human race, all things have proceeded from God, and are every moment dependent upon him for their continuance and mode of existence.*

6. This opinion, taught by Plato and Epicharmus, was derived from the Védánti School of India, the fundamental tenet of which was, that solidity, impenetrability, and extended figure depended upon a continued effort of the Divine energy; and consequently the secondary qualities of matter also, derived from these the primary qualities.† In modern days Sir I. Newton supported the opinion, that gravity was the primary force of the universe, and dependent upon a continued volition of the Creator. Such also was the opinion of Dr. Clarke;‡ and Professor Stewart advocated very similar doctrine.§

7. As the cause of vital and psychical phenomena has been confounded with the phenomena themselves, so the cause of cosmological phenomena has been confounded with its effects; and philosophers have erected that into a deity which is but an instrument of the Supreme mind. It was thus that the philosophers and people of the East came to worship fire; and thus Hippocrates, in expressing not only his own sentiments, but those of Heraclitus and many of the stoics, says, "It appears to me that what is called heat (the elemental fire) is immortal and omniscient; that it sees, and hears, and knows, all things, present, and to come."‖ Doubtless much of the figurative language of the Old Testament has the same Eastern origin.

8. Heat also has been considered the animating principle. Cicero quotes Lucilius Balbus as maintaining, that whatever lives, be it animal or plant, it lives by its *calor inclusus*.¶ Harvey attributes life to an animating principle in the blood;—a *calidum innatum*, totally different in its operations from ordinary heat, and analogous to the element of the stars.**

9. According to Diogenes Laertius, Anaxagoras the Clazomenian was the first who considered mind as well as matter to be a primary independent principle; commencing his work with this sublime observation: "All things at first existed together in a state of confusion: Mind then came and arranged them (διεκοσμησε)." He maintained also that mind was the cause of motion; "νουν μεν αρχην

* An Inquiry into the Opinions, ancient and modern, concerning Life and Organization, by J. Barclay, M.D. Edinburgh, 1822. P. 430.

† D. Stewart, Philosophy of the Human Mind. 2d edition, Vol. ii. Note B.

‡ "All those effects which we commonly say are the effects of the natural powers of matter and laws of motion, of gravitation, attraction and the like, are indeed (if we will speak strictly and properly) the effects of God acting upon matter continually and every moment," &c. Clarke's Works, fol. ed. ii. p. 698.

§ "Matter, therefore, is not a thing which has a separate and independent existence, but an *effect* which is continued by the constant agency of Divine Power." Philosophy of Human Mind, 2d ed. ii. p. 188.

‖ Barclay, Op. cit., p. 82.

¶ De Natura Deor. lib. ii. § 9, 10, 15.

** De Generat. Animal. Exercit. lxx. Lond. 1651.

κινησεως."* Analogous but more specific are the doctrines of that ancient and remarkable system of cosmogony written by Moses, and which has been ridiculed by pretenders to philosophy, because they had not the grasp of mind sufficiently large to comprehend it. Moses declares, that "God said let there be light, and there was light." The term in the original translated light does not mean the light of the sun, or of a luminous body simply, but rather the cause or matter of both light and heat; corresponding, in fact, to the fire of the ancients, and the caloric of the moderns;† which latter is now considered by many as nothing more than a modification of the primary forces of matter, or of those powers of repulsion which Boscovich attaches to unextended elements to constitute matter of itself.‡

10. The theories of Aristotle and Leibnitz are very similar, and may be easily resolved into the same general principles as the preceding. Even La Place's cosmological theory, so far as it goes, corresponds almost exactly with the Mosaic account. See Edin. Rev., Vol. lxxvii., p. 297.§

11. It is a remarkable fact in the history of the human mind, that the opinions of the wisest men of all ages, respecting cosmogony and life, have such a striking general coincidence. All the cosmological theories that have been hitherto produced differ only in the terms in which they are announced, in their comprehensiveness, or their illustrations. I believe it would be utterly impossible for the finest genius to originate a hypothesis entirely novel.‖ The three

* Barclay, op. cit., p. 37.

† Dr. Adam Clarke in Commentary.

‡ Daubeny on the Atomic Theory, 8vo. Exley's New Theory of Physics, 8vo. 1829.

§ The French neo-platonic school holds doctrines nearly resembling those of Leibnitz; there is little more than a difference of terms. De Lamartine, the most popular living poet of France, is of this school; and in its spirit he thus writes of the atoms seen in a sunbeam.

"Pourtant, chaque atome est un être!
Chaque globule d'air est un monde habité!
Chaque monde y regit d'autres mondes peutêtre,
Pour qui l'éclair qui passe est une éternité!
Dans leur lueur de temps, dans leur goutte d'espace;
Ils ont leurs jours, leurs nuits, leurs destins, et leur place;
La pensée et la vie y circulent à flot;
Et pendant que notre œil se perd dans ces extases,
Des milliers d'univers ont accompli leurs phases
Entre la pensée et la mot!"

"*Jocelyn*, an Episode," 12mo, 1838, Tom. i., p. 196.

‖ This resemblance is kept up even in the details. Thus when Dr. Elliotson, in ridicule of the doctrine that the soul is an independent entity, asks, "where the depôt of souls is; how they learn when a youth has impregnated an ovarian vesicle; and how they fly and get into it," &c., (Physiology, 5th ed. p. 41,) he merely resuscitates some Lucretian banter:—

"Denique connubia ad Veneris, partusque ferarum,
Esse animas præsto, deridiculum esse videtur;
Exspectare immortaleis mortalia membra
Innumero numero, certareque præproperantur
Inter se, quæ prima, potissimaque insinuetur."

Lucret. lib. iii. 777.

essentials already mentioned must constitute the basis of any theory of mind.

12. It is to be regretted that speculations respecting the immortality of the soul are still mixed up with the physiology of mind. The knowledge of the existence of God; of ourselves and of matter; of a future state; of right and wrong; and of moral liberty, are inherent in our nature: and if they were not confirmed by revelation, ought no more to be questioned than mathematical truths. No inductive arguments can render our perceptions of them clearer, or throw a stronger light on these abstruse subjects.* Nor would I have entered at all upon the consideration of these, had it not been absolutely necessary to understand clearly the point at which we may safely commence our reasonings about things as they are.

13. It appears to me the more reasonable and philosophical to assume, that there is an agency in man (and for anything we know in other animals), distinct from matter and organization, but dependent upon organization for the due display of its effects. The consideration of its essence, its origin, or its future state, is in no degree connected with the question. Its nature appears to me as incomprehensible as that of the Deity. I find, however, that mind perceives the existence of matter by its qualities, which are dependent on force; and I am compelled to conclude, that force could not have existed without mind;† that finite minds could not perceive matter without force; that matter without mind and force would be inert, or essentially nothing.

14. Mind is that which originates motion or wills; perceives the qualities of matter; and compares the perceptions or thinks.‡ What the infinite mind is to the universe, a finite mind is (physically) to its corporeal organs. "Princeps ille Deus, qui omnem hunc mundum regit, sicut animus humanus id corpus cui præpositus est."§ There is this remarkable difference, namely, that the Supreme Mind originates force, while the finite only transfers it;‖ or in other words, excites motion; the former originates the qualities of matter, the latter can only feel their effects on organized matter; the Divine Mind thought before matter existed, we think with our brains.

* Dr. Reid advises us "to take our notions of the qualities of body from the testimony of our senses, with the Peripateties; and our notions of our sensations from the testimony of consciousness with the Cartesians."—Inquiry, &c., Chap. vii. This eclectic spirit of inquiry has always been the most successful.

† "I agree with Sir Isaac Newton, that power without substance is inconceivable."—Reid on the Intellectual Powers, Essay ii., Chap. 14.

‡ "Mind, we say, is that which feels, which thinks, which has the power of beginning motion."—D. Stewart on the Active and Moral Powers. Edin. 1828, Vol. i. Notes, p. 401.

§ Cicero, Somnium Scip. § iii.

‖ "Yet neither by life nor the subject of it, do I mean a principle of motion; the universal stock of motion as that of matter being neither increased nor diminished, but only transferred; but I mean a certain power to determine the manner of its being transferred," &c.—Grew, Cosmologia Sacra, Fol. 1695, p. 65.

15. In assuming the power to will and perceive changes in matter as the efficient cause of mind, in the popular sense of the term, I am quite willing to concede that it is not necessary that the physiologist should decide whether this efficient cause be independent of the brain or not. With regard to myself after duly considering the subject, I feel certain it will be; but in this world we can know nothing of it, except as manifested by its effects on the brain; and through the brain on the nervous system. By these effects, and by our consciousness, we are assured of its existence. By our own consciousness, because we are as sensible of the power to will and perceive, as we are of the action of light; and it would be just as rational to deny the existence of the one as of the other. By its effects, because motion plainly follows volition, or, in the words of Locke, "sensation convinces us that there are solid extended substances, and reflection that there are thinking ones; experience assures us of the existence of such beings, and that the one has power to move body by impulse, and the other by thought."* In short, the will exerts a force on organized matter—the brain, in exciting motion, as plainly as the force of matter acts on the nerves in exciting sensation. As any attempt to explain the nature of these forces would only be to reason in a circle, I rest content with having ascertained their existence. Their effects are the legitimate object of scientific research.

16. The most superficial observation has rendered it certain that the effects of these forces on the phenomena of life are manifested through a complicated apparatus. And certainly nothing has tended so much to retard the progress of psychological knowledge as the neglect of vital mechanics by those who have studied mental phenomena; while the conflicting theoretical details of metaphysicians, and the mistaken zeal of well-meaning philosophers. have combined to drive the physical inquirer from the field of psychology, and to set up a mode of investigation, which, prosecuted principally by metaphysical inquirers, was utterly insufficient, because directed to the elucidation of ethical philosophy, and limited to the objects of man's consciousness, or, in other words, to his own thoughts. The effects of external stimuli on the mind were altogether unnoticed, or only mentioned incidentally as belonging to the domain of the physician.† Even Locke scarcely ventured to refer to the brain and nervous system; but it is not a little curious that brain may be substituted for mind in numerous passages of his works. He speaks constantly of the mind as the organ, and of the will, and understanding or perception, as the agents. Professor Stewart overlooked the phenomena of vital mechanics, while Gall and his followers have paid too exclusive an attention to them as partially exhibited in the brain. In both these instances we have

* Essay on the Human Understanding, Book II. chap. 23, § 28, 29.

† Metaphysicians too are bad observers. This Dugald Stewart plainly acknowledges and explains. (On the Human Mind, ch. vi. § vii.) And it is because young men are better observers than logicians that they are materialists.

been deprived of the benefit which would have resulted from a combined consideration of psychical and vital phenomena.

17. In general, the action of the molecules of matter on each other excites motion; but it is by the reaction of gaseous and solid matter that the greatest amount of force or impulse is developed. In solid matter, the particles are compelled to occupy less space by what has been called the force of cohesion; in gaseous matter they are supposed to be repelled from each other by a repulsive force, which is eliminated or set free whenever the gaseous matter becomes solid. This force (9), stored up in the atmosphere may be considered the prime mover not only of those machines of the present day, which exemplify in so remarkable a manner the power of mind, but even of the vital mechanism which they mimic.* From the sensation which it excites when acting on a living body, it has been called heat, or the matter of heat. Separating the particles of water from each it produces steam, varying in power according to the amount of repulsive force or heat acting on the particles. If the supply of air be cut off from the furnace of the steam-engine, decomposition is arrested, heat is no longer evolved, and the motion of the whole machinery connected with the boiler is stopped. So if the atmosphere be excluded from the galvanic battery, decomposition ceases at the poles, gaseous matter is no longer evolved, the weight drops from the helix, and light cannot now be produced.

18. So too, we shall find that the amount of temperature and of capillary and muscular action required by animals have a distinct ratio to the consumption of atmospheric air (8); or, in other words, the respiratory apparatus will always have a magnitude proportionate to the activity of the vital movements of the individual.

19. It may also be stated as a principle applicable to all organisms, whether vegetable or animal, that an apparatus for the mutual action of solid and gaseous matters must constitute the basis of every individual organism.† In plants, as is well known, the leaves are the respiratory organs, and the roots the nutritive; corresponding in function to the stomach of animals, and indeed have been likened to a stomach turned inside out.

20. If we would obtain a large and definite knowledge of the action of force upon matter and intelligence; in exciting the phenomena of life and thought as displayed in man, we must examine the laws of its action as exhibited both in every living organism, and in the molecular changes of inorganic matter. A thousand circumstances assure us that between these last and the highest efforts of human intellect, there is a continuous chain of phenomena, although we have been unable to follow it link by link. These links are so continuous between certain vegetables, and animals of

* "La sensibilité se rattache, peut-être, par quelques points essentiels aux causes et aux lois du mouvement, source générale et féconde de tous les phénomènes de l'univers."—Cabanis, Physique de l'Homme, Mem. ii. § iii.

† La vie est une suite de mouvemens qui s'executent en vertu des impressions reçues par les differens organes."—Cabanis, op. cit. Mem. i. § iii.

the lowest class, that naturalists have been unable to decide whether the organism should be placed in the animal or vegetable kingdoms. And even when there can be no doubt of the nature of the individual, circumstances still show forth the similarity of laws by which all organisms are governed. Thus in plants we find the male and female organs in the same individual constituting a true hermaphrodite; but in animals which have the male and female organs in one individual with the power of locomotion, the congress of two is required. Some animals, however, are without this power, as the acorn shell-fish, which consequently impregnates itself like plants, and is a true hermaphrodite.

22. This and numerous other illustrative instances show the close connection of all organic matter, and render it probable that no bio-molecular movements take place in animals of even the highest organization, which have not their counterpart in vegetables and animals of the lowest forms.

23. In the last mentioned there is no central nervous system, as in animals of a higher grade. The nutritive and respiratory functions are carried on by powers originating in, and connected with, a mechanism diffused through the tissues of the organism; so that a leaf, or a portion of a polypus or planaria, possesses, independently of the parent being, the essentials to continued vital action, namely, a respiratory and nutritive apparatus.

24. If we advance a step higher in the animal scale we find a distinct nervous system having a centre of action (a ganglion); and just as a plant, so may an individual animal be really a congeries of individuals; each segment or ganglion with its dependent tissues having a power of maintaining a continued and independent existence when separated from the others. Illustrations of this fact are afforded by sections of some Annelida, as the Nereides and Naiades.*

25. Advancing in the scale of development we find that, just as the diffused nervous system became dependent upon a central ganglion, so these various ganglia become dependent upon some one or two which have attained a development superior to the rest, and which are essential to the integrity of the functions of the whole; these more important ganglia are subservient to the nutrition of the whole system; respiration is still diffused, and when the ganglia are separated from each other they will still present vital movements, the intensity and duration of which will be always in proportion to the power of nutrition and respiration possessed by the segment, and to the amount of force required for their continuance.

26. It is thus the parts of articulated animals (as insects) which have a large respiratory apparatus diffused through the body, dis-

* "As each segment of the *tænia* is complete in itself, and capable of independent existence, so each segment of the body throughout the helminthoid classes may be viewed as a separate being, with its exterior covering, and its muscles, its vascular and digestive apparatus, its brain and its nerves of motion and sensation."—Dr. Grant, Lectures in Lancet, ii. 1833–4, p. 487.

play vitality long after mutilation; it is thus also that parts of certain cold-blooded Vertebrata, as the salamander, frog, and turtle, display such remarkable tenacity of life. In these we have various circumstances favourable to continued vital action. 1. The vital movements can go on at the temperature of surrounding bodies, so that force is not expended in keeping up the heat of the vital mechanism; nor is the action of the latter impeded by its diminution, as in hot-blooded animals. 2. The skin is a respiratory organ, so that force is still obtained from the atmosphere by this, and perhaps even by the moving tissues themselves,* long after the proper respiratory apparatus is destroyed. Cuvier was partially right in asserting that the irritability of muscles is directly proportioned to the quantity of air the animal consumes; but he might have added also to the quantity needed, and to the diffusion of the respiratory apparatus; the air being the source of both motive power and warmth. (18.)

27. But in the higher Vertebrata, the ganglia are more centralized, the vital mechanism in connection with them requires a higher temperature, and the only source of this is a highly complicated apparatus, the action of which is solely dependent upon a central ganglion; so that the animal is absolutely individualized, and the destruction of the respiratory ganglion will arrest the movements and functions of the whole system. Consciousness itself (which is seated in the brain) is thus abolished, and hence the mistake of Mr. Mayo, who, finding destruction of that part of the *medulla oblongata* which contains the respiratory ganglion to produce this effect, supposed this portion of the nervous axis to be the seat of consciousness.†

28. Now, just as the diffused nervous system embodies the elements of the ganglionic; and the movements in connection with the former (the movements of irritability) are typical of those dependent on the latter—the reflex or excited; so are the ganglionic phenomena illustrative of the cerebral; and the mode of action of the brain itself as the organ of the mind, may in some degree be ascertained by an analysis of the series of phenomena just reviewed.

29. The discoveries of modern anatomists and physiologists have not yet been made available for this purpose; and the physiology of the brain has been studied altogether independently of that of the ganglia of the cord. The labours of Tiedemann, Meckel, Serres, Cuvier, Grant, and others have, however, accumulated a mass of facts and analogies of the highest utility, especially in establishing the identity of structure of the brain and spinal cord. I would refer the reader, in particular, to Mr. Solly's lucid compilation as clearly establishing it.‡

* It is probable also that the tissues themselves are specifically different in their functions from those of the hot-blooded, and analogous to those of the cold-blooded articulata and animals with a diffused nervous system.

† Outlines of Human Physiology, 3d edition, p. 229.

‡ The Human Brain, its Configuration, Structure, Development, and Physiology. London, 1836.

30. Leaving the reader to ascertain the truth of the following propositions for himself, from a perusal of the various facts collected in Mr. Solly's and the works of various writers on comparative anatomy, I shall simply assume, that in man the hemispherical ganglia are ganglia central to the whole system, and the seat of mind (14); that other portions of the encephalon form distinct nervous centres; that each pair of nerves originates from a series of ganglia in the spinal cord, analogous to those of the Articulata, but concealed by the addition of fresh parts, and by those nervous tracts in connection with the central or terminal ganglia; that the ganglia on the posterior roots are not the ganglia of the sense of touch, (which probably form a constituent part of the encephalon, See p. 131,) but are accessory to the secreting structures imbedded in the skin, and precisely analogous to the ganglia of the sympathetic, (which aid the secreting structures of the viscera,) and to those diffused in the tissues;* and, lastly, that all these ganglia, whether cerebral, spinal, sympathetic, or diffused in the tissues, have the same generic character. (28.)

31. It is by no means my intention to review the whole of our knowledge respecting the structure and fuunctions of the ganglia; I shall confine myself to those prominent points which may illustrate the principal phenomena of those diseases I have been investigating.

32. The phenomena first to be noticed are those in which consciousness is directly involved, and which I have already enumerated. (1.) That the encephalon is the organ of consciousness, is a proposition almost universally acknowledged. It was the received opinion of the ancients; Newton, Dr. S. Clarke, Locke, Malebranche, Hooke, Des Cartes, Reid,† and others among metaphysicians, have more or less admitted it; and it has been asserted by a host of medical observers, who are certainly the most competent to give an opinion. Among these may be mentioned Willis, Haller, Sömmering, Prochaska, Portal, Sabatier, Vicq-d'Azyr, Gall, Cuvier, and C. Bell.

33. It is in the encephalon, then, that those changes, which are excited by external and internal stimuli, are manifest to intelli-

* Schwann observed microscopic ganglia in the mesentery of a frog; and farther researches on the mode of termination of the nerves in the tail of the larva of the toad have confirmed these observations. Muller's Physiology, translation, p. 604. Gall observes that ganglia have been found on the nerves of the arms and thighs, "Anatomie et Physiol. du Syst. Nerv. Tome i. p. 65." I remember finding a ganglion on a nerve in the wrist. In the 42d vol. of the Ed. Med. & Sur. Jour. a paper by M. Camus will be found, in which certain bodies resembling small ganglia are described as placed on the nervous fibrils, distributed to the plantar and palmar surfaces. I think all these must be considered as analogous to the optic and other small ganglia of the face. More may be found if carefully sought for, especially in parts of special sense.

† There is, therefore, sufficient reason to conclude, that in perception, the object produces some change in the organ; that the organ produces some change upon the nerve; and that the nerve produces some change in the brain. Essay 2, ch. ii.

gence; or, in other words, consciousness consists in a perception of the changes thus originated in the brain by the forces of matter; yet not in the brain as a whole, but especially in the cerebral lobes or hemispherical ganglia. The will also is seated in this part; and as we are conscious of the power to perceive, so are we conscious of the power to will. These faculties, however, admit of no investigation, except through their relations to vital mechanism. (24.)

34. We find that the changes excited in the system by the action of external forces are communicated to the brain and other ganglia by the sensitive nerves; that the will acts upon the muscles so as to excite motion through the motor nerves: and that a third class of nerves, the organic,—which are subservient to the perfection and repair of the vital mechanism, are influenced by certain mental agencies, of which we are conscious, but which are independent of the will; as happens in all the vital changes connected with emotions.

35. Of these nerves it may be stated, that they all communicate with a hypothetical point of perception and volition seated in the brain, and termed the *sensorium commune:* this point constituting the central, and the opposite, the peripheral termination of a nerve. It is not intended by this to advance the common doctrine, that all the nerves depart from one common centre; but rather, that they communicate with several central points situated on one common circle. Professor Müller conceives the nerves to be all spread out at their central extremity to receive the influence of the will, and compares them "as they lie side by side to the keys of a piano, on which our thoughts play or strike."*

36. The convolutions of the cerebrum and cerebellum have been described by Gall and Spurzheim as consisting of two fibrous layers, containing between them a layer of gray matter;† or, in the more recent language of Mr. Solly, they are an extensive surface of cineritious neurine, to which medullary fibres present their extremities. When we consider the enormous surface which these ganglia must thus possess, and the fact, as demonstrated by Weber and Smith, that the sensible points of the retina measure no more than $\frac{1}{800}$ of an inch in diameter,‡ which may be considered the diameter of the sensible points on this surface, there is much less ground for surprise at the infinite variety of our sensations.

37. It was inferred long ago from the phenomena of health and disease, that the fibrils of the nerves must be insulated in their whole course from the periphery to the centre, and *vice versa,* but it is only recently that the microscope has enabled physiologists to demonstrate the fact. For this we are principally indebted to Ehrenberg and Müller.§ To the labourers in the new field of research

* Physiology, p. 686 of Dr. Baly's translation. This seems a favourite idea, as it is repeated by the Professor.

† Anatomie et Physiol. Gener. du Syst. Nerv. &c., i. p. 299, sqq.

‡ Prof. Müller's Physiol. p. 702 of translation.

§ Ebrenherg's Researches may be found in Vol. xlviii. of the Ed. Med. and Surg. Jour., and with Professor Müller's in the Physiology of the latter.

opened out by Sir C. Bell's discoveries, we are also indebted for a vast number of facts exceedingly elucidatory of the phenomena of nervous diseases. It is to the laws of sensation which have been thus illustrated that I must principally confine myself.

38. The doctrine of the excito-motory functions of the spinal cord, which, although not discovered, have been investigated and promulgated with much zeal and perseverance by Dr. Hall; and the numerous facts accumulated by a careful observation of the phenomena of life, as well in vegetables as in animals, render it certain that there may be all the recognised phenomena of sensation, without consciousness. Thus the eyelid of the comatose will shut when the conjunctiva is touched; and decapitated cold-blooded Vertebrata and Articulata exhibit a variety of combined movements long after removal of the cerebral ganglia.* Now, as conscious sensation depends on the latter, I shall consider the phenomena just mentioned as indicating physical sensation. In this term I comprehend the efficient cause of the motions of vital matter which follow the application of an external stimulus; so that the sensitive plant has physical sensation as much as the decapitated turtle or apoplectic man.

39. These movements in animals are simply the results of vital mechanism excited into action independently of the will. When the mechanism is not complicated, as in muscular fibres, or vegetable structure, it is said to be endowed with irritability. If complicated, the resulting motions are termed involuntary, instinctive, automatic.

40. If the continuity of a sensitive point with the brain be interrupted, external stimuli applied to it excite no sensation; and when the sensitive nerve of a limb be divided the extremity is as insensible to burning, pricking, &c., as if it had been altogether separated from the trunk. But if the cut extremity still in connection with the general system be irritated, sensation is excited as if the terminal point on the limb had been irritated, and not in the part touched. These facts are too well known to need illustration.

41. Independently of the common inference drawn from them, it may be added that, as one function of the spinal cord, as regards the sensitive and motor nerves, is that of a conductor, all irritation of a sensitive nerve, whether in the spinal cord, or, even as far as its termination in the brain, must excite sensation referred to the peripheral point. Sir C. Bell was the first, I believe, to point out these facts. Dr. Combe has also illustrated them,† and Professor Müller has pushed these inquiries still further. As his facts and in-

* The proboscis or *antlia* of a common butterfly will coil up and uncoil when touched, three or four hours after separation from the insect. Kirby and Spence, Entomology, iv. 191.

† "If we select a filament of a nerve of sensation, whether it be pricked or injured in the foot, thigh, spine, or brain, the perception arising will be referred to that part of the skin where the remote filament is distributed."—Sir C. Bell on the Nervous System, p. 18. Dr. Combe's remarks may be found in his Observations on Mental Derangement, p. 8 sqq.

ferences, so far as they go, resemble those which I proposed to publish in the Ed. Med. and Surg. Journ. some time before I saw his, I refer the reader to the Professor's excellent Manual of Physiology for further information; and with greater confidence from the circumstance just stated. Nevertheless, I think these laws of sensation are capable of further illustration and application.

42. It may be inferred, that each point of a sensitive nerve has the same properties as the peripheral extremity; for, if stimulated, the same mental perception is excited as if the latter suffered the stimulus; if its extremity in connection with the brain be destroyed, its functions equally cease; and since it is matter of fact (40), of a legitimate inference, that these may be predicated of a point in a sensitive nerve in any part of its course, even to the last globule, it is a fair inference that, so far as regards consciousness, the powers of the central and peripheral termination of a sensitive nerve are identically the same.

43. Sensation is not a perception of the qualities of bodies, but of the changes, which these excite in the terminating molecules of the sensitive nerve; and which changes, when derived from the periphery, appear to be propagated from molecule to molecule, just as the (so called) electric or galvanic fluid, (14, 34,) consequently, any sufficient cause acting upon the molecules of a sensitive nerve in any part of its course, will excite these changes, or increase or diminish its susceptibility of change, as much as if applied to either end. Thus in inflammation, such changes are excited in the peripheral terminations of the sensitive nerves, that we are conscious of heat and pain; and those impressions formerly unfelt or pleasurable now excites pain; provided similar changes be excited in any point continuous with the brain, or in the terminal point on the brain itself, there is a precisely similar affectible state of the peripheral end, as occurs in inflammation; although it be not involved in any disease whatever. Tic-douloureux, phrenitis, and hysterical neuralgia, illustrate this inference. So also, if the ganglia receiving the central termination (36) be rendered incapable of propagating the change, (33,) either by disorganization, or narcotics, we have sensation abolished equally as if the peripheral had been so paralysed. These principles are of the highest importance, and admit of most extensive application to all the phenomena of consciousness.

44. The same laws of action, *mutatis mutandis*, are as applicable to the motor nerves; and it is exceedingly probable that the action of all nerves is essentially similar.* Motion, like sensation, may be excited in vital mechanism, by internal and external agencies.—1. We have the change in the central termination, which originates motion when excited by the will. 2. There are the involuntary movements excited by internal stimuli, as by the passions, organic

* At least of those on similar apparatus. Thus the loop-like termination of nerves observed both in the brain, and muscular structures, (Müller, op. cit. p. 603, 606,) may indicate an analogy of function.

disease. 3. The reflex, or those excited by stimuli applied to the periphery of the nerve, still in connection with its ganglionic centre; and 4. The movements of irritability, or those excited by stimuli applied to the nerve, as it is diffused among muscular fibres, and separated from the general system.

45. Sensations may be classed into simple or primary, and complex or combined, just as movements; and may not they be characterized under four subdivisions similar to the preceding? (44.)

46. *Firstly*, can such changes as shall become objects of perception be excited by volition? When we recal ideas by a volition, we re-excite those changes in the brain which constitute the original sensation. Thus, when a painter makes a picture of a friend who is absent or dead, he recals the features by an act of will, and makes them an object of thought as much as if they were afforded by the original. It will be remarked that I am reviving the opinion of those who considered that all our perceptions are connected with changes in the brain; and although so high an authority as Dugald Stewart has pronounced opinions of this kind unphilosophical, yet I must venture to adopt it after many ancients, and Malebranche, Hooke, Locke, and Haller. If we acknowledge the brain to be the organ of the mind (32), I cannot possibly conceive how we can assert that no changes take place in it during our mental operations; if such be the fact, of what use is that wonderful and complicated piece of machinery? But daily experience is utterly opposed to such doctrine. In what these changes consist it is unnecessary to inquire; we may be certain, however, that they do not differ essentially from other vital changes, and that their type must be sought for in those occurring in the diffused nervous system, or in the ganglia. (28, 30.)

47. That volition will excite changes in the fibrils in connection with the perceptive and intellectual organs is plain from the phenomena of attention. We are conscious that we attend by an act of the will; and it is analogous to the excitement of motion by the will in this, that the greater the energy of voluntary attention, the longer appears the duration of time.

48. Attention (which may be either voluntary or involuntary) may be directed either to the changes excited by external stimuli, when it consists essentially in the production of such physical changes in the central fibres as to render them more susceptible of impressions, whereby more vivid perceptions result (43); or it may be directed to the changes produced by internal stimuli, as our own thoughts. In the latter case the action of the will is intermittent,* as it probably is in the former. So, also, when we will motions

* When we are employed in studying an object not interesting, Professor Stewart says, "it is not an exclusive and steady attention we give it, but we are losing sight of it, and recurring to it every instant; and the painful efforts of which we are conscious are not (as we are apt to suppose them) efforts of uncommon attention, but unsuccessful attempts to keep the mind steady to its object," &c.—Philosophy of the Human Mind, Chap. vi. § i.

the volition is not continuous but intermittent, as any one may learn by listening to the contractions of his own masseter muscle.* Dr. Elliotson allows that we may will attention but denies that we can call up a feeling at pleasure. However, the fact is otherwise.

49. By an act of the will we can also excite new sensations. Let an individual concentrate his attention upon the interior of his head for a few minutes, and he will experience various sensations on the skin, analogous to formication (43). Any one may will a sensation in their finger end by directing their attention to it (48). Dr. Elliotson mentions instances of this kind,† and the phenomena of Mesmerism (so called) are continual illustrations of the power of the will over the brain, either directly or indirectly through attention. To these I shall refer again. It is thus people can ward off attacks of nervous disease by an effort. (See p. 119, 125.)

50. Internal stimuli excite involuntary movements (convulsions); can they excite involuntary sensations? or, in other words, such changes in the brain that perceptions may be excited? Internal stimuli may consist in organic disease of the fibrils; in increased or retarded circulation of the blood through them; in alteration of its constituents as by poisons: or in changes induced in it, or in the nervous system by the passions. Dreams and spectral illusions of every kind are thus excited; so also are all sensations primarily connected with things external, but re-excited by functional or organic changes in the brain or spinal cord. Thus nervous patients complain of primary sensations, as whizzings, flashings, hammerings, explosions, and voices. Once, when half awake in bed, I heard my own name called most distinctly in my ear, yet no one called. A person had a continual smell of pus which nothing could relieve; after death an abscess was found in the *corpus callosum*.‡

51. Maniacal illusions are frequently spectral, but the individual cannot perceive their incongruity with impressions derived from without; and hence incongruous sentiments and actions. In these cases the ideas or changes are secondary or complex; and may originate in false primary sensations. These various sensations and affections of the sensitive fibres may all be considered analogous to convulsive or involuntary motions.

52. External stimuli produce such changes in the nervous cen-

* Dr. Wollaston's acute observation first made us acquainted with this fact. (Phil. Trans. 1810, p. 2. § sqq.) He found the intermissions to be about 20 or 30 in a second. Dr. Elliotson (Physiology, p. 479), attempts to disprove the accuracy of Dr. Wollaston's conclusions, but forgets the important fact that these vibratory motions are not of a set of muscles, but of particular fibres. I have easily listened to them many times in bed, by placing the side of my head and face close to a moderately firm pillow, and then closing the jaws forcibly, so that the contracted masseter may press the pillow. The vibrations will be found to be quickened according to the force of contraction excited. I have counted 140 in a minute when using a gentle force. Is there not an analogy here to the peristaltic class of movements, as of the heart?

† Human Physiology, 5th edition, p. 497.

‡ Cabanis, Op. cit. Mem. iii. § i.

tres that the involuntary motions termed reflex, follow:—can they produce analogous sensorial phenomena?

53. Dreams have hitherto been among the most inexplicable of the phenomena of mind. Nothing, I think, can equal the clearness, acuteness, and originality of Professor Stewart's explanations, which have been treated with much unmerited neglect. Acknowledging the influence of the will in exciting mental phenomena, he remarks, that in sleep it "loses its influence over all our powers both of mind and body; in consequence of some physical alteration in the system which (he adds) we shall never probably be able to explain."* In accordance with this proposition he explains the incubus by supposing it to differ from ordinary sleep, in this, that uneasy sensations render us distinctly conscious of our inability to move."† Stewart explains dreaming by supposing that the thoughts arise from associated ideas only; the voluntary power over the ideas being suspended (49); and he attempts to establish two propositions, 1. That the succession of our thoughts in sleep is regulated by the same general laws of associations as when we are awake; and 2. That the circumstances which discriminate dreaming from our waking thoughts are such as must necessarily arise from the suspension of the influence of the will.

54. This is not the whole truth, but it is quite correct as far as it goes. Stewart's explanation of the action of opium on ideas, and of the phenomena of somnambulism, are equally clear and philosophical as regards the altered relations of the will to the brain; and superior in this respect, I think, to the more modern of Macnish and Elliotson, who have copied from him. By changing a few terms, and adding those explanations derived from physiological facts, with which Stewart was not conversant, it will be easy to show, that the excito-motory phenomena of Dr. Hall, confined by him to the spinal cord, have their analogues in the cerebral hemispheres. In short, that there is a large class of combined involuntary sensations of ideas which are excited secondarily by stimuli from without, and may be termed excito-sensory, if Dr. Hall's nomenclature be followed.

55. The only motions now remaining, then, for which we have to seek an analogue in sensorial phenomena are those of irritability. To save the time of the reader, I must here hypothetically assume that the brain is not only a centre but a periphery, corresponding to the external periphery from which sensitive nerves originate, and in which the changes originated by matter commence; but itself originating fibrils which carry changes in the opposite direction, so that the action of the will on this internal periphery in exciting sensation and emotion must be considered as analogous to that of force on the external periphery (15,) (36).

56. The action of force and will on organized matter, then, may be considered as identical; and the molecular changes induced by the will on the internal periphery as analogous to those

* Op. cit. Chap. v. Part v. § v. † Ibid.

induced by the forces of matter on the external. Consequently, the changes indicated in Section 50 are analogous to those of irritability.

57. And I may here add, that these peripheries correspond in their powers in other modifications of life and thought. Tickling the feet will excite as hearty and involuntary laughter as tickling the fancy by a ludicrous idea; in the latter case, the series of molecular changes combining to produce this spasmodic action of the respiratory muscles, and propagated to the proper centre, originate on the internal periphery; in the former, on the external.

58. Having thus sketched a very broad outline of the doctrine, that vital actions are essentially the same, whether displayed in vegetables, or in animals, with a diffused nervous system; whether in these, or ganglionated animals; or, whether in the spinal cord or brain; I shall be able to review the remaining phenomena of hysteria synthetically presenting them as illustrations; and shall also possess a new starting point for an analytical inquiry into the seat and nature of the whole series.

59. Coma consists in an abolition of consciousness. There is no volition, nor any perception of external or internal stimuli; and life consists in a series of automatic movements. It is scarcely necessary to particularize its numerous proximate causes. It is frequently a very alarming symptom of hysteria, and, as might be expected from my preceding remarks (see p. 103), is consequent upon every exhausting agency of a certain degree of intensity, as profuse blood-lettings or other evacuations; debilitating diseases of mucous surfaces, mental or bodily fatigue, and violent passions. It is very frequently induced by poisons, whether they enter the system by absorption, or consist of the excrementitious matter accumulating in the blood from deficient elimination; as when the excretion of bile, urea, or carbonic acid is prevented by diseases of the kidneys, liver, or lungs. Profound sleep is the type of coma; in both, there is complete paralysis of the brain, and the usual changes which constitute ideas and excite volition, are not originated by any stimulus whatever.

60. When the causes of coma acts with less intensity, changes are excited which we perceive; but there is still paralysis of the primary organs of perception and volition. We can both perceive and will, but the changes in the motor nerves necessary to motion cannot be excited, nor can we perceive the primary changes or sensations in the sensitive fibrils resulting from external stimuli. These, however, originate other changes which become objects of perception, and which are analogous to reflex movements (53, 54).*

* The opinion, that the perceptions of our dreams are resuscitated ideas, is very common; but the above remarks refer to the mode in which they originate. The following will illustrate the text. I dreamt I was perambulating some of the narrow dark alleys of the parish of St. Giles, London, visiting dispensary patients; I breathed in them with difficulty; and, at last, in one I felt as if suffocated. I awoke in affright, and found the bed-clothes twisted about my face, obstructing

61. Delirium originates from all the causes which will excite coma or paralysis, only they act with less intensity than in exciting the former. We have a less amount of paralysis of the cerebral organs; ideagenous changes, or changes producing ideas, (33, 43,) are more complicated, because the primary sensations derived from without are more or less perceived; the motor nerves may in an equal degree be influenced by the will; and the sensory apparatus is also in part under the same control, for the individual is capable of an act of attention (48); or, in common phrase, he will listen or speak when aroused;—the act of will placing the sensory apparatus in a state such that external stimuli produce a more vivid impression, removing, in fact, the paralysis during the effort, just as motor paralysis may be removed by the same means.*

62. Spectral illusions are dependent upon similar morbid states, the affection being frequently circumscribed, and there being no paralysis of the primary sensitive fibrils. Consequently, all the senses give correct impressions, and unless the individual be insane, that is, have paralysis of the comparing and judging organs, he is perfectly aware of their real nature.

63. The causes of spectral illusions are the same as those of other nervous diseases, of which they are frequently a symptom, and are influenced by the same circumstances. They are observed in cases of epilepsy, loss of blood, injuries of the scalp, &c. They are most frequently perceived in the night, as are the other phenomena of functional nervous diseases: and are perhaps more common in children than usually suspected, their tales of ghosts being generally disbelieved. The spectres are of those classes of objects which are more familiar or impressive to the individual, or have been early or deeply impressed on the mind.† They follow indeed the laws of memory in every respect.

64. Another peculiarity is, that the spectres are most frequently dressed in red. Mr. Abernethy mentions an instance of this kind;‡ and Mr, Macnish asks why they should appear in red rather than blue.§ The solution of this question must be sought for in the laws of the sensorial action of colours, a glimpse of which I have already indicated (See p. 142).

65. Other sensorial illusions are analogous to the spectral, as of voices, and tactile sensation.‖ One remarkable illusion is that in

respiration. I dreamt of running and walking rapidly, least I should be left by a party; and awoke in my hurry as wet with perspiration as if I had been using the most violent exertion. Now, in these instances, I conceive the sensations of perspiration and obstructed respiration became associated with other ideas, and gave them their connection.

* In these cases the attention or effort of will is involuntary. Sensorial paralysis or insanity may, as well as common paralysis, be removed by the same means. A case of a lunatic cured by fright may be found in Med. Chir. Rev. xxvii. p. 540.

† Dr. Alderson's Cases in Edin. Med. and Surg. Journal, Vol. vi. Mr. Craig's case, with remarks, by Dr. Craigie, in Ibid. Vol. xlvi. Wesley's Journal, *passim*.

‡ Lectures in Lancet, Vol. xi. p. 27. § Philosophy of Sleep, 2d ed. p. 261.

‖ Case by Dr. Bright, in Guy's Hospital Reports, No. iv.

which the individual refers his sensation to some other person. A man comes home exceedingly drunk, and is positive his servants are too drunk to undress him. A delirious patient when he was hungry said his nurse was.* I visited an individual dying of sphacelus of the leg. He clutched at the air, expecting to grasp a fish-hook, (being an experienced angler,) (63,) and when lying still and moaning, turned round and asked occasionally, "Who was disturbing him so?" "Who was in pain!" An individual returns late at night from a public assembly, where he has taken more fluids than customary, and he dreams of the company, and that some one is in great distress from a distended bladder, which he strongly recommends the supposed suffering individual to evacuate. The pain increases; the whole assembly appear conscious of it, and is disturbed; and at last he awakes to find that the distended bladder is his own. This mistaken individuality is sometimes observed in the insane.

66. Spectral illusions vary in degree from those of complete delirium and mania, to that state in which the perceptive organs are in full vigour; and, as another proof that the sensorial fibres are in some mode under the control of the will, it may be mentioned that they may be made to appear or disappear in some cases by an act of will, and have actually become a source of amusement to the patient, who has diverted himself by calling up or dismissing the phantoms at pleasure. One individual informs me that his illusions have very much the character of the phenomena of the kaleidoscope. He can make them disappear by shutting his eyes, although they appear in the night.

67. Somnambulism is also one of the same class of sensorial affections as dreaming, delirium, and spectral illusions; and it has the same affinity to other nervous diseases. It would but weary the reader with a repetition of illustrative facts.† It is much more common in children than suspected, being overlooked because their actions are less definite, and the attack does not depend upon permanent change in the brain. Like other nervous diseases it is hereditary and heptaperiodic,‡ and almost invariably occurs in the night.

68. Somnambulism has attracted considerable attention from its facile excitement in hysterical females, by various movements called *passes*. I have already pointed out that an act of attention is, in fact, an act of the will; which, I may now add, produces a state of the sensorial fibres analogous to that resulting from various nervine alteratives, as strychnia, opium, loss of blood, &c.

69. It must be remembered, however, that although all sensorial volitions are necessarily accompanied by exalted affectibility of that portion of the nervous system willed on, other portions become by a law of our constitution less affectible in various degrees,

* J. Hunter's Works, i. p. 335.

† See *post*.

‡ Macnish, op. cit., p. 162, 171. Elliotson, op. cit., p. 659.

to complete *anæsthesia;* and in the same order, as occurs on the approach of sleep, or in cases of mania, poisoning, exposure to excessive cold, or in great fatigue.*

70. When about to sleep, external stimuli cease to excite primary sensations, long before the secondary ideagenous changes they produce are no longer objects of consciousness. The maniac or delirious, wrapped up in one idea, and with exalted faculties of music, poetry, or mimicry, will have almost lost the sense of touch; and will thrust his feet into fire without the slightest expression of pain.† In intoxication the system is at first over-excited, and then there is loss of common sensation, so that the tippler is most happily unconscious of external injuries, even the most severe, although his mental powers be at the same time exalted. And such precisely is the effect of intense attention. Marini, an Italian poet, while revising his poem Adonis, had the anæsthesia of attention so remarkably, that he burnt his leg severely before he was aware.‡ How often, when absorbed in thought, do loud sounds fall unnoticed on the ear? The most instructive illustrations of the connection between cerebral excitement and partial anæsthesia are found in those cases in which inflammatory action within the cranium occurs during the progress of phthisis; when all pulmonary irritation so completely ceases that it has been supposed there was a metastasis from the thoracic viscera to the encephalon. Dr. Abercrombie,§ and Dr. Storer,‖ have noticed this class of cases.

71. Any proceeding, then, which will concentrate the attention of a person endowed with an affectible nervous system, upon any portion of the brain, will excite that portion, but at the expense of the affectibility of other portions; and according to the degree of affectibility, the amount of excitement, and the varying powers of the organs acted on, we may have phenomena varying in intensity.

72. There may be simple headache only, or anomalous sensations in the parts to which the attention of the Mesmerized individual has been directed (49); coma, spectral illusions or delirium (68), characterized as loquacious, musical, &c., according to the portion of brain most affected; and *lastly*, the higher phenomena of connected dreaming or somnambulism may appear.

73. Complete anæsthesia, excitement of the brain giving rise to vivid spectral illusions, and voluntary power over the motor fibres, are the distinguishing characteristics of somnambulism.

* Dr. Burrow's Comment. on Insanity, p. 465, and other writers.

† We have the authority of Captain Parry, and Colonel Shaw for the fact, that both these will excite a state resembling that of intoxication.

‡ D'Israeli's Curiosities of Literature, Vol. ii., p. 397. Cabanis makes a variety of interesting remarks on consciousness, with reference to the more uncommon forms of nervous affection. He unfortunately compares it with a fluid, the quantity of which is determined; so that if it be increased at one point, it is proportionally diminished at another. (Rapports du Physique et du Moral, R. Mem. ii. § vi.)

§ On Diseases of the Brain and Spinal Cord, p. 49.

‖ Edin. Med. Chir. Trans., Vol. iii., p. 613.

74. It is very improbable that the somnambulist derives any primary sensations from without. His actions result altogether from internal sensations; and if they appear to have the precision of waking, it is because the somnambulist is in a locality corresponding to his dream. Remove him from the locality, and he gropes and stumbles.

75. Sometimes, however, the anæsthesia is not complete. The individual is rather delirious than sleeping, and secondary sensorial changes which have a relation with his dream are perceived.*

76. The spectral illusions of the somnambulist are, like those in other cases, derived from objects familiar to the individual, or which have impressed him at an early age. Their vividness also will depend upon the amount of power by which the attention is concentrated, which itself will be a definite ratio to the anæsthesia; there being no changes excited in the paralyzed sensorial organs, such as to direct the act of will to them. There are individuals who possess a remarkable power of forcibly impressing upon their imaginations any scenery they have heard described or witnessed. The blind have this faculty in an eminent degree; and so the re-excitement of these impressions during delirium or somnambulism would be proportionally more vivid in them. We have thus, I think, a natural and plausible explanation of those marvellous instances in which the soul is supposed to leave the body, (just as the vulgar imagines it acts in sleep,) to visit objects and cities it had never seen. The catch-penny tale of Colonel Stone's mental journey with a blind Mesmerized female to a distant city at which she had never been, is simply the history of a somnambulistic dream.

77. An act of the will on the sensorial organs is strictly analogous to common motor volition in this, that it becomes easier by repetition, and at last involuntary. After an individual has been Mesmerized repeatedly, certain movements (passes) are no longer necessary to the excitement of sensorial volition; it has become a habit, is produceable by the slightest associated circumstance, and may even be under the direct control of the will. The phenomena themselves are not willed, but the changes which excite them are; and this, I conceive, has been the mode in which disinterested observers have erred. There cannot be a question that the O'Keys thus excited real phenomena† just as hysterical girls can bring on

* Occasionally somnambulism assumes a form very similar to drunkenness. Sauvages (Nosol. Method. Tom. ii.) relates the case of a female who was insulted by a rustic while menstruating; periodical attacks of cataleptic somnambulism were induced in which she would mistake her medical attendant for her enemy, and follow him, or his shadow round the room. She had no recollection of her husband. The comic annals of drunkenness abound with analogous instances, *e.g.* a lisping young gentleman was intoxicated and fell into a ditch on his way home; after swallowing a mouthful of the water he very politely exclaimed, "not a sthup more, thank you." Worms in the alimentary canal are sometimes coexistent with a similar state; a case may be found in Vol. xlii. of Edinb. Med. and Surg. Journal.

† Lancet, Vol. ii. 1837–8, *passim*, especially the leading article of Sept. 8th.

convulsions at will, and anybody ideas, sensations and mental emotions, with more or less facility.* Consequently there can be no question of the possibility of voluntary common somnambulism, being induced by Brahmins and Fakirs, as stated by Dr. Elliotson from a French writer.†

78. There can be no doubt that this voluntary power of exciting real phenomena has frequently aided impostures. An epileptic may thus easily induce a fit. The Pythian priestess, the wizards of Kamtschatka, the whirling dervises of India, the serpent-eaters of Egypt, the second-sight men of the Highlands, the "wise men" (μαγοι), and prophets who may still be found in Yorkshire, and the O'Keys, are all of the same family. All knowing how to excite convulsions, delirium, spectral illusions, and somnambulism in themselves or their dupes by mental acts or drugs.‡

79. The prophetic power, (so called,) observed in cases of ecstacy, somnambulism, &c., is probably a very simple phenomenon. It may be considered as nothing more than an exalted faculty of judging and comparing, itself the result of morbid excitement. Many religious enthusiasts have exhibited it:§ it has been observed in dreams; individuals in the delirium of death have prophesied. Aretæus observed the power developed in the patient towards the fatal termination of καυσος, or brain fever;‖ Patroclus when dying foretells the death of Hector; and Hector in his last moments the death of Achilles. Virgil, in imitation of Homer, makes the dying Orodes predict the death of Mezentius,¶ and Shakspeare has similar scenes. Sir H. Halford has witnessed an instance of this kind.** Mr. Madden explains this lightening of the mind before death by

* "We can excite a sensible degree of the passion of anger in our own breast, by imitating the looks and gestures which are expressive of rage."—D. Stewart on the Active and Moral Powers, Ed. 1828, p. 119. This is one of the great secrets of good acting.

† Human Physiology, 5th ed. p. 692.

‡ An act of attention may be and often is involuntary or instinctive. Point at the hand of a nervous female and she will complain of a sensation as if cold or warm air was blowing upon the part pointed at; this I have often verified. The sensation probably depends upon changes in the central termination of the sensitive nerves, (43, 48,) excited by the action of attention. Of this character are many sympathetic phenomena.—*e. g.* A female aged 48, who had not menstruated for eight years, while attending her daughter during a tedious labour, experienced uterine pains, a sanguineous discharge from the vagina, and on the third day the mammæ swelled and became painful to the touch; a milky fluid escaped from the nipples for five or six days, and the symptoms then disappeared. Dr. Paillard relates a similar case (Med. Gazette, i. p. 550). Sir B. Brodie has had patients who, having a friend with cancer of the breast, have worked themselves up into the belief that they had the same disease. (Had they tumour of the breast?) Sir Benjamin also remarks, "that there is no part of the body but what seems to be in pain during a state of disease, if the patient's attention be drawn to it."—Lancet, i. 1838–9, p. 40.

§ Wesley's Journals. ‖ De Caus. et Sig. Acut. Morb., Lib. ii. cap. iii.

¶ Æneid, x. 740.

** Essays and Orations, 2d ed. p. 60. This essay (the 6th) contains numerous classic allusions.

supposing that venous or deficiently aërated blood acts as a stimulus, producing effects resembling those of opium. Physical pain is lulled; the sensations exalted and soothed; long forgotten pleasures recalled, &c.* Most persons must have witnessed at one time or other the ecstacy of dying piety; and which must be considered as the testimony of a well-spent life, for it is but the re-excitement and exaltation of previous ideas and feelings by the physical changes in the brain which precede death. (50.)

80. As a general fact, it may be stated, that gradually impaired or interrupted function of both the sensitive and motor nerves, is preceded by increased affectibility and exalted energy. This is continually shown in sleep, mania, poisoning, loss of blood, &c. Professor Müller also notices this general fact, distinguishing the states by the terms excitable and paralytic.†

These, and the remarks made on hysteric cunning (see p. 96), will amply suffice to explain the phenomena of Mesmerism, without having recourse to the dreamy theories of the Germans, and of their imitators in France and England.

81. Before dismissing this part of the subject, I may be permitted to call the attention of physiologists to the sensorial action of colours, as affording a clue to a further analysis of sensorial phenomena, with especial reference to their chemical relations to light and its alteratives. Red and its complementary colour, green, present the most prominent points for inquiry. (See p. 142.)

82. In attempting to ascertain the nature and seat of the diseases I have been investigating, I shall follow the synthetical plan, with reference to those symptoms which implicate the cerebral ganglia.

83. We have found that a large number of vital phenomena are performed without consciousness (38); consequently, there must be a class of nerves to which the laws of consciousness are not applicable; and which must be the organs of physical sensation (38) and involuntary motion.

84. It is only within the last years that the division of nerves into motor and sensitive, for many years hypothetical, was experimentally demonstrated by Sir C. Bell. The nerves of the sympathetic system have always been distinguished from every other; and have been most recently investigated under the name of the gray or organic nerves. Dr. M. Hall has very recently advocated the theory of a system of nerves, distinct from the preceding, which he has termed the excito-motory, and which comprehends two sets of nerves, the incident and reflex; and which Mr. Grainger thinks he has demonstrated.‡ Lastly, the researches of Bellingeri, and numerous observations on muscular action in health and disease, lead to the inference that there is another set of antagonising nerves distributed to all antagonising muscles.§ These

* The Infirmities of Genius illustrated, 2 vols. 8vo. † Op. cit. p. 711.

‡ Observations on the Structure and Functions of the Spinal Cord. London, 1837.

§ In Vol. xlii. of Edin. Med. and Surg. Journal, p. 400.

nerves, according to Bellingeri, are distingushed as well in their origin as termination; the brain and anterior columns of the spinal cord being in connection with those that regulate the motions of flexion and abduction; and the cerebellum and posterior column, with the nerves of flexion and abduction.

85. The nerves, then, are, 1, of common sensation; 2, of special sensation; 3, of voluntary motion; 4, of incident sensation; 5, of reflex motion; 6 and 7, of the antagonizing system; and 8, of secretion. It may be remarked, however, that if the principle upon which this division has been founded be once admitted, the genera and species of nerves may be extended indefinitely. The nerves of secretion may be as numerous as the secretions and excretions; and we may very fairly infer from the physiological action of colours that there are special fibrils for the perception of each. Whether the principles be correct or not, such an arrangement would be inconvenient, and I shall therefore adopt the usual division, with certain modifications.

86. The sensitive nerves of both systems (the voluntary and involuntary) may be divided into nerves of special and common sensation, or, in other words, into cerebral nerves of special conscious sense and common sensation (33), and ganglionic nerves of special physical sense and common sensation (38).

87. The nerves of special conscious sense are distributed to the organs of the senses, including the tactile apparatus on the skin; and perhaps ought to be considered as essentially nerves of physical sense prolonged to the ganglia of consciousness. Their office is to communicate to the sensorium the effects of force on the peripheral molecule of the nerve (43), whether displayed in the various primary qualities of matter, as resistance, (comprising hardness, elasticity, &c.,) weight, and temperature; or displayed on etherial media, and giving rise to the phenomena of hearing and vision. They are all distributed to special apparatus both of sensation and motion, together with nerves of special ganglionic sense, as in the sphincters; but are in direct connection with the hemispherical ganglia.

88. The nerves of special ganglionic sense communicate physical sensation (38, 39), to the encephalon and ganglia in connection with instinctive and involuntary movements.* That the sensitive nerves of the sphincters (which latter are in fact the terminations of the external tegument) are both cerebral and special ganglionic nerves, is proved by such facts as the following: Irritation of the nerves of the bladder being communicated to the spinal cord, excites, in

* In illustration of the text, I may state that ganglionic nerves of special sense are, like the cerebral, distributed on special apparatus; it is thus that reflex movements are excited more vigorously by touching certain points of the surface than the trunk of the nerve, a fact noticed by Whytt, Volkman, and others. See translation of Prof. Müller's Physiology, p. 722, and the note by Dr. Baly, p. 710, Mr. Grainger reports experiments most pointedly illustrative of the fact in his recent work on the Spinal Cord, p. 55, sqq.

addition to involuntary muscular action, such changes upon the sensory fibres traversing that part of the cord, and derived from the skin covering the perinæum, groins, thighs, and orifice of the urethra, that sensations are perceived in them according to a general law (41, 43), but not within the bladder or urethra; irritation of the intestinal canal (as from worms) may excite a reflex movement (tetanus); or the sensation of tickling or itching of the nose and anus, and probably irritation of the pharynx, and consequent vomiting. The pain of colic or of stone is seated in a nerve of common sensation, and differs altogether from those affections of special sensitive nerves which, when irritated, always give rise to the sensations peculiar to them. Thus, the optic nerve, when mechanically excited, originates sensations of light, the auditory of sound,* &c., and so disease of the spinal cord causes tingling in the skin, never in the stomach or intestines.

89. Tickling the sides of the thorax excites the same sensations and movements as a ludicrous idea; so will tickling the feet (57). In the latter case, when disease of the spinal cord has destroyed the continuity of the nerves with the hemispheric and respiratory ganglia, we have neither laughter nor conscious sensation (87); but if the dorsal or lumbar ganglia be uninjured, and are in an affectible state, we have convulsive retraction of the extremity. It is upon these and analogous phenomena that the excito-motory theory is founded. But I think it a more simple explanation, to suppose that the phenomena vary according to the ganglia in which the changes excited in the peripheral end of the nerve terminate (56, 87), or according to the affectibility of those which the nerve traverses. If the series of changes could be arrested in the respiratory ganglia, we might have loud laughter without consciousness (88). The relations of the cerebral and ganglionic sensitive nerves to the secretory are analogous to the preceding. Secretion like motion, may or may not be accompanied by sensation.

90. When the instinctive or involuntary movements are accompanied by conscious sensations, they appear to be simply those of pleasure and pain, which powerfully aid in the conservation of the animal, and continuance of the species.

91. Galen's experiment on a fœtal kid was perhaps the first which demonstrated that instinctive actions were at least independent of experience. But the bias to metaphysical theory for a long time prevented them being viewed in their proper light. In 1771, Unzer pretended (to use the words of Gall) that the irritation of a nerve, whether it arrived at the soul or not, could of itself, and independently of the will or power of the soul, produce an impression upon the nervous and muscular systems, and excite movements. He thus attempted to explain the actions and habits which appear spontaneous in certain animals. He showed also, that, in those classes

* Gall and Spurzheim, op. cit. Tom. i. p. 130. Muller, op. cit. p. 623.

of animals which were supposed to possess a soul, and in man himself, movements take place without the participation of the soul, and which consequently continue a certain time after death.* Prochaska treated largely of those movements subservient to the conservation of the animal; and showed how they might be excited by external stimuli, without the intervention of the will or consciousness. (39.) Mr. Grainger unacquainted, apparently, with these writers, takes up the same doctrine.

92. Dumas inferred from various facts, that voluntary movements and consciousness do not depend upon the brain, which was an error. In support of the doctrine, he quoted the experiment of Duvernay, who removed the brain from a pigeon without apparent injury; it continuing to live, eat, and perform various functions. He also referred to the experiment performed by Perrault on a lizard or viper, which lived and ran to its hole after its head was cut off and intestines removed.

93. Gall does not appear to have suspected the great truth concealed beneath these facts. He was certain that the opinion of Dumas was erroneous; but he never supposed that there might be all the phenomena of conscious sensation without consciousness, and independently of the hemispherical ganglia. He therefore treated the facts as unworthy of credit; called them edifying tales; and recommended physiologists to verify observations before they founded theories upon them, which contradicted all the known laws of organization.† Gall was a man wrapped up in one idea, or he would have taken the trouble to verify the observations himself at the nearest fishmonger's.

94. Yet he acknowledged that analogous phenomena, namely, the instinctive actions of young animals, take place without consciousness; and even attempts to explain them.‡ Although Gall thought he triumphantly refuted the accusations of those who maintained that he was renewing the old doctrine of innate ideas, he does not satisfactorily explain why a chicken with the shell still on its tail will peck at a spider or a grain of corn, or why the calf of a tame cow by a wild bull exhibits unusual fierceness. No one will imagine for a moment that chickens learn by experience what is their proper food, or that the calf learns from its dam.

95. But Gall extended still farther the doctrine of innate ideas, (for such it really is,) and fell into the views of Unzer and Prochaska (91). He maintained that joy, sorrow, fear, &c., are not excited by the will, but are felt before the individual has so much as dreamed of them. All that passes is an arrangement produced by nature, intended for the external world to secure "la conservation de l'animal et de l'homme, sans qu'il y ait conscience, reflexion, ni participation active de l'individu."§ He also asserted

* Gall, op. cit. Tome i. p. 7.
† Op. cit. i. p. 81.
‡ Op. cit. ii. p. 11.
§ Op. cit. ii. p. 12.

that these passions, when of a certain intensity, are accompanied by actions which are independent of the will and of consciousness; but which all tend towards the end proposed by nature, the conservation and ease (90) of the individual. Thus in fact classing the phenomena of the passions with the movements excited by external stimuli independently of consciousness and of the brain, and which have been remarked on by Unzer, Haller, Prochaska, Hall, Müller and Grainger.*

96. This slight historical sketch furnishes ample proof, in addition to that I have already given, of the truth of the proposition, that the cranial ganglia, although the seat of consciousness and will, are subject to the same laws as those which govern the other ganglia, the diffused nervous system of lower animals, as the *Hydra viridis*, and the vital mechanism of vegetables (28). In short, that in the whole series there is a machinery perfectly adapted to external nature.

97. In man, however, there is certainly something more. While brutes merely follow the impulses, simple or compound, derived from pleasure and pain, man has a mechanism adapted to a moral world, and in this the will forms a prominent feature. A consideration of its relations is the object of ethical philosophy.†

98. The physiological and pathological facts upon which the excito-motory theory is founded are quite analogous to the preceding, and may be found at length in the works of Dr. Hall, in Professor Müller's Manual of Physiology, and in recent volumes of the British Medical Journals. I may also add, that the cases and illustrations I have published constitute a series of similar facts.

99. With regard to the whole class of combined movements with sensation, noticed in my last paper, (see p. 133,) and which themselves are the phenomena accompanying various forms of ideas, emotions, and impulses, and are consequently involuntary, it may be remarked, that they furnish additional proof of the existence of the hypothetical internal periphery before noticed, (57,) as corresponding to the external. Whether its components be essentially distinct, as Dr. Hall supposes those of the external periphery to be; or whether there be two peripheries, one the organ of conscious, the other of physical sensation, in connection with the instinctive or automatic movements, is matter for further inquiry.

100. The causes of these combined movements are similar to those by which combined ideagenous changes are excited, and which constitute spectral illusions of every kind. (50.)

101. Special or general convulsive movements, being with the

* Professor Alison must also be added to the list, if he still maintains the opinion given at p. 355 of his Outlines of Physiology.

† It is not probable that inferior animals have a moral consciousness; that is of the power to will or not will, and of a Deity. "Quæ est enim gens aut quod genus hominum, quod non habeat sine doctrina, anticipationem quondam deorum? quam appellat προλήψιν Epicurus," &c. Cicero de Natura Deorum, Lib. § 16, 17.

exception of the antagonizing movements (see p. 133, § 3, 137), dependent on the spinal ganglia, are never perhaps connected with sensorial changes, except in so far as the affectibility of the system is increased by acts of attention, whether they be voluntary or involuntary (48, 68, 78, note). It is thus the sound of water dropping, or the perception of brightness, or mental emotions, excite hydrophobic gasp, and tetanic and other convulsive movements. (See p. 117, *sqq.*)

102. The organs implicated will, of course, vary according to the parts of the nervous system in which there is a morbid action; and according to the varying influence of the hurtful agents. Thus we have found that, in females, the organs under the special influence of the generative system are peculiarly liable to morbid action, the phenomena of which constitute the largest portion of the symptoms of hysteria. (See p. 68, *sqq.*)

103. We have now to inquire what central parts of the nervous system are implicated in these diseases. I have already partly ascertained this. In a previous page, (see p. 105,) I deduced the synthetical principle that the organs in connection with the two ends of the spinal cord were principally affected.

104. The general relations of the cranial ends of the cord are obvious from the foregoing inferences. We have found that the fundamental organs in all organisms are a nutritive and respiratory apparatus; and that the due action of these is necessary to the continued existence of the individual (19). External stimuli act upon these in vegetable and the lower animals, solely; there is no sensation nor consciousness, because there are no ganglia.

105. In higher animals the mechanism of these functions is concentrated in the cranial cord, (25, 27,) being still, however, under the same general laws; and as we find a variety of mental phenomena subservient to the same purposes, and regulated also by the same general laws, (95,) it is a fair inference that the seat of these is in a part of the same nervous system; in short, that mental emotions and physical sensations act upon a sensorial system in anatomical connection with the ganglia of respiration and nutrition.

106. The connection of the lower end of the cord with the generative organs is also obvious, from the first part of the analysis. (See p. 105.) But the physical sensations in connection with the reproductive functions do not differ in their nature from those of the conservative; are equally imperative and extensive (see p. 95);* and, as appears from the whole series of phenomena, are closely connected with the respiratory ganglia (103). So that both the conservative and reproductive mechanism within the cranium, and connected with sensation, will be found in connection with the ganglia just mentioned.

107. The phenomena resulting from the centralization of the functions of the respiratory apparatus and its dependencies in the

* "Le plus grand acte de la nature, est la reproduction des individus et la conservation des races."—Cabanis, in Analytical Table by D. Tracy, prefixed to his Memoirs, p. lv.

respiratory ganglia and from their connection with cranial ganglia of involuntary sensation and movement, constituted the basis of all those medico-metaphysical theories of the ancients and moderns, which located a soul in the epigastrium, diaphragm, and heart. But the varying states of the blood, and its consequently varying action on the nervous system, received merely a secondary consideration; or were noticed only in the conflicting theories of the Humorists and Solidists.

108. The blood is the product of the respiratory and nutritive apparatus; there is a remarkable similarity existing between the phenomena of hysteria and those resulting from a morbid state of the blood (see p. 103, *sqq.*); the processes of secretion and excretion, upon which the healthful state of the blood depends as well as the action of mental emotions and sensations upon the processes themselves, are, for the most part, involuntary; so that we must look to the same nervous centres for a common centre of secretion; or, at least, we may be quite sure that the centre through which the secreting organs in general are influenced by the passions, (see p. 113,) is seated in those parts of the nervous system indicated in section 105.

109. We find that the appearance of physical love is dependent upon the development of certain organs,—the ovaries (see p. 64 and *sqq.*) not less than the due evolution of other structures, as the uterus, mammæ, &c.; and it becomes a matter of some consequence to inquire, by what means the ovaries exercise this influence. That is to say, 1. Whether it be communicated directly to the organ implicated through special communicating nerves; or, 2. Whether a similar communication exists between the ovaries and the nervous centres, in connection with the ovarian dependencies; or, 3. Whether the ovaries pour into the blood a secretion which has a special action upon these structures.

110. With regard to the first proposition, I think it altogether untenable. It may be stated in favour of the second, that emotions or passions act upon precisely the same structures, and excite analogous phenomena, and we are certain that the influence of these is unquestionably from the centre to the circumference. So that sensorial changes may be propagated from the generative structures to their appropriate nervous centres, and there give rise to a series of changes, to be reflected, on the one hand, to the sensorium of consciousness; on the other, to the organs on the external periphery; and so give rise to intellectual phenomena, and a series of movements and secretions.

111. The third has a general fact, also, in its favour, namely, that substances taken into the circulation will act upon one part of the nervous centres in preference to another. It is not certain, however, that these act so exclusively from the nervous centres as mental emotions.*

* Cabanis advocated the doctrine, that there were different centres of sensibility; but he confined them to the abdominal ganglia. "Il existe dans le corps vivant,

112. The disciples of Gall conceive that that talented individual has set the question at rest; he, as is well known, having appropriated the cerebellum to the sexual passion; and made development of the generative organs and of their accessory structures dependent upon this portion of the encephalon. Gall has immortalized himself by his persevering maintenance of the indubitable truths, that the brain is the organ of the mind, and that it is a compound organ; but he was not free from the very common and pardonable fault of all discoverers of general principles, that of pushing the application of them further than warranted by fact.

113. The appropriation of the cerebellum solely to the sexual impulse is as contrary to the first principles of phrenology, as the assertion, that the brain is the individual organ of mind. The cerebellum is generically analogous in structure to the cerebrum (36); and, *à priori*, it appears unreasonable to appropriate so extensive a surface to acts, which, in many animals, occupy a most disproportionate portion of their existence. The natural history of its development, its anatomy, and anatomical connections, and numerous physiological and pathological facts, furnish also irresistible proofs that Gall's doctrine is erroneous; and that the cerebellum is as compound an organ as the cerebrum.

114. That the cerebellum is connected with the involuntary system is evident from many facts; and that it is in some way connected with the phenomena of hysteria, is now a very prevalent opinion. These propositions, and its peculiarly central position with regard to all nervous structures, induce me to take it as a starting point.

115. The cerebellum is connected with the antero-lateral and posterior columns of the spinal cord inferiorly; and with the posterior lobes, optic thalami, (posterior cerebral ganglia,) and *tubercula quadrigemina* (optic ganglia) superiorly.

116. Mr. Solly thus arranges the fibres connecting the antero-posterior columns with the cerebellum.* There is a superficial and a deep set; one part of the superficial fibres cross the surface of the cord immediately below the *corpus olivare;* emanating from the *corpora pyramidalia*, and decussating with those of the opposite side.† Another portion takes the same direction posterior to the inner side of the *corpus olivare*, and form the outer part of the *corpus restiforme*, as they ascend to the cerebellum.

117. The deep set arise posteriorly, and are separated from the posterior columns by the posterior fissure.

118. The posterior columns in ascending to the cerebellum form

indépendamment du cerveau et de la moelle épinière differens foyers de sensibilitié où les impressions se rassemblent en quelque sort, comme les rayons lumineux, soit pour être réfléchies immédiatement vers les fibres motrices, soit pour être envoyées dans cet état de rassemblement, au centre universel commun."—Mem. vii. § ii.

* Op. cit. p. 155.

† When hemiplegia occurs from disease of the opposite half of the cerebellum, may it not be explained by these decussating fibres?

a portion of the *corpora restiformia*, (which Mr. Solly calls the auditory ganglia,) and are partly overlapped by, and partly interlaced with the fibres from the antero-lateral columns.*

119. In addition to these, Gall states, that fibres from the anterior pyramids cross in the *pons Varolii* at right angles to commissural fibres from the cerebellum; and decussate in the proper sense of the word.†

120. The *processus è cerebello ad testes* (the oblique inter-cerebral commissure) connect the cerebellum superiorly with the parts indicated, Section 115.

121. According to Mr. Solly, the fibres on the surface of the *processus è cerebello ad testes*, and the valve of Vieussens (which is itself a ganglion), may be traced distinctly to the optic ganglia.

122. The external fibres go first to the side of the optic ganglia, from thence to the posterior cerebral ganglia, and (Mr. Solly thinks) to the hemispherical ganglia.

123. The deep or descending fibres interlace with the ascending fibres of the sensory tract; and then pass through the *locus niger* of the *crus cerebri* to become continuous with the motor tract, and also with the portion of the fornix which takes its origin from this point. Are these distinct from the fibres described by Gall? (119.)

124. These nervous connections must not be considered as being confined to the cerebellum, for they distinctly bring the posterior cerebral and optic ganglia into relation, not only with the cerebellum, but also with the external and internal peripheries. The connection of the respiratory ganglia with the latter structures, the cerebellum, and the posterior cerebral and optic ganglia, is next to be ascertained.

125. The respiratory ganglia are connected with the whole of the external periphery. Professor Müller remarks, that "the whole system of respiratory nerves can be excited to action by irritation of any part of the mucous membranes from the mouth to the anus, from the nostrils to the lungs;"‡ and Dr. Marshall Hall makes the spinal nerves distributed on the skin to be excito-motory nerves of respiration.§ This is nothing more than might be inferred from their natural history and comparative anatomy. (23, sqq.) The vagus in many animals, as Professor E. H. Weber has shown, supplies in great part the place of the sympathetic. This is the case in snakes, for instance, in which it is distributed to a great part of the alimentary canal. In the myxinoid fishes the vagus extends as far as the anus, and the sympathetic nerve is absent.‖

126. Sir C. Bell has described a lateral tract of nervous matter which he termed the respiratory, and which is in relation with the olivary bodies. This opinion has been very generally neglected; but whether justly or not may be doubted. If the doctrine just advanced be true, there must be some such tract composed of those

* Op. cit. p. 225. † Ibid. Tom. i. p. 276.
‡ Op. cit. p. 715. § Lectures on the Nervous System, London, 1834, passim.
‖ Professor Müller, op. cit. p. 726.

nervous fibrils which connect respiratory ganglia with the externa periphery; and I think it is now proved beyond question, that the olivary bodies are these ganglia.* These bodies must also be the ganglia of the nutritive apparatus when we consider the distribution of the nerves with which they are connected. Consequently, if the inference in Sect. 105 be just, we must seek for the seat of the instinctive movements in parts having a close connection with the olivary bodies.

127. According to Gall, a considerable band (*fort faisceau*) of fibres proceed from the olivary bodies behind the gray matter of the *pons Varolii*, and between its transverse fibres into the *crura cerebri*, of which they form the posterior and inner part. After being increased in the *locus niger*, they ascend and form the posterior cerebral ganglia.† Previously to entering these some fibres have been observed to turn inwards, so as to give the *tubercula quadrigemina* their medullary investment, and to enter the valve of Vieussens. In other words, there are fibres connecting the respiratory, optic, posterior cerebral, and hemispherical ganglia.

128. Sir C. Bell does not appear to consider the bands springing from the olivary bodies as connected with the latter; he names them cerebral strands of sensation, being separated from the motor in the *crus cerebri* by the *locus niger*. Neither does Mr. Solly adopt Gall's views; he describes the fibres as ascending principally to the outer side of the *corpus olivare*, and plunging into the *pons Varolii* to pursue their course to their appropriate ganglion, the posterior cerebral as stated by Gall.‡

129. If we would have a right view of the functions of the optic thalami we must consider them as independent ganglia, just as the olivary bodies, and having their own special and independent relations. It is probable that the changes impressed on the external periphery of sensation undergo here some modification or combination previously to their final perception on the hemispherical ganglia. From various considerations I shall adopt the anatomical views of Gall, as exhibiting the nearest approximation to the truth, and consider it probable that the parts mentioned, Sect. 127, are those through which the passions act on the respiratory apparatus, and the whole external periphery (125).§

* Solly, op. cit. p. 146, sqq. † Op. cit. i. p. 278.

‡ I think the anatomical views of Bellingeri throw considerable light upon this question. He considers the lateral portion of the antero-lateral column to be a distinct band, which he names the lateral strand. (Bell's respiratory tract.) Upon this the respiratory ganglia are placed, and from it, according to Bellingeri, the accessory nerve arises. (See Vol. xlii. of Edinb. Med and Surg. Jour. p. 392, 394.)

§ Bellingeri advocates the doctrine, that the filaments derived from the lateral strands regulate the instinctive, involuntary, and organic motions, as maintained in the text. But he considers the restiform bodies to be the respiratory ganglia. This I think is disproved by numerous vivisections. In support of the view taken in the text, it may be observed, that the optic lobes in fishes are developed in an equal ratio with the optic nerves and olivary bodies. Dr. Grant also agrees with Gall in stating that the latter chiefly form the optic lobes. Lectures in Lancet, i. 1833–4, p. 553, and I think the opinions of Tiedemann are also similar.

130. There are a number of conservative acts excited by impressions derived from the visual, auditory, and olfactory apparatus, and consequently there must be some connection between the nerves of special sense distributed to them, and the nervous centres just indicated. This connection is obvious enough with regard to the optic nerves, but very obscure with respect to the olfactory and auditory ganglia. An analysis of the various uncertain statements respecting their anatomical relations would occupy considerable space with but an unsatisfactory result. I must, therefore, leave this part imperfect, with the hypothetical opinion, that some such connection must exist, and the hope that these opinions may lead anatomists to a new train of investigation. Physiological and pathological observations point out a close relationship between the optic, olfactory, and auditory nerves, and the organs of respiration.* Sounds induce hydrophobic gasp; the action of light excites respiratory acts, (see p. 130,) and some odours vomiting and dyspnœa.

131. If we revert to the doctrine, that all ganglia are formed upon the same type (30), and examine the anatomical connection of the cerebellum with other parts of the system as just given with special reference to the functions of the spinal ganglia, as demonstrated by Hall, Müller, and Grainger, it would appear that the cerebellum corresponds in function to the posterior columns of the spinal cord, and the optic, posterior cerebral, and hemispherical ganglia (which must be considered extended surfaces (36)), have the same relation to the cerebellum as the external periphery in connection with each spinal ganglion has to the posterior segment. In the latter case the movements of those muscles only which are in connection with the ganglion are excited, while in the cerebellum we have a ganglion in communication with the whole muscular system.

132. When suitable changes, then, are excited in the ganglionic peripheries just indicated, and propagated to the cerebellum, combined movements may follow analogous to the reflex.

133. Whether the cerebellum be the organ only of combined movements subservient to the conservation of the animal and the continuation of the species, and involving the whole muscular system, or whether it be the channel through which mental emotions act on the respiratory apparatus, I am not prepared to say. It is quite certain, however, that the passions do act through a channel different from that of the will, if it be granted, that when a nervous fibril is incapable of responding to a volition, it cannot be excited to action by a common mental emotion. Of this the following case is a pointed illustration.

134. A young married female, labouring under a disease analogous to those I have been treating of, had palsy of the muscles of

* I ought to state that I have traced a most unequivocal connection between the olfactory nerves and the optic commissure, in the form of a fasciculus of fibres stretching across the *substantia perforata*. Is it not equally distinct in every brain? I have also noticed the appearance of a canal in the olfactory nerve.

the face. She was unable to retain the saliva; while speech and the power to produce articulate sounds was completely lost; and she had no command over the muscles of the face. But the eyelids, although not under the influence of the will, closed involuntarily on the sudden approach of a body towards the eye. The patient smiled and laughed, and the muscular emotions thus produced were the same as those observed in the normal condition. The sound of her laughter, also, proved that the muscles of the larynx, although beyond the reach of volition, were capable of being affected by an internal stimulus.*

135. In this case we have, 1. The excitement of the will cut off by disease, corresponding to division of the spinal cord. 2. There is an internal or mental stimulus derived from the brain, corresponding to the excitant of reflex movements derived from without. 3. We have laughter excited independently of the will by this stimulus acting upon the ganglionic connection of the respiratory muscles. (57, 89.) Taking this case† and the anatomical details just given into consideration, I think we may fairly suppose that there is a communication from the seat of emotions (129) to the respiratory ganglia, independently of the will-fibres.

136. Whether this communication be through the cerebellum, or more directly, does not appear; but it will be at once seen that the preceding remarks are quite corroborative of the theory, that the cerebellum is the seat of combined movements, and which has been more or less acknowledged and advocated by Hertwig, Flourens, Bouillaud, Rolando, Foville, &c.

137. Many of the symptoms which consist in deranged muscular action, and the results of vivisections, are quite in accordance with this doctrine. Epileptic convulsions, chorea, and combined movements, as I have already shown, are all in close relation with each other. (See p. 110, 125, 135,) found that rigors (a constant attendant on convulsive paroxysms, especially the hysterical), and convulsions followed irritation of the *tubercula quadrigemina*. Extirpation of one of them caused blindness of that side and involuntary rotation—an observation confirmed by Hertwig and Bouillaud. Flourens gradually sliced away the cerebellum. During the removal of the first slices, only a little weakness and want of harmony in the movements occurred. As the experiment proceeded, disorderly and abrupt movements were excited; and the faculty of flying, walking, standing up, &c., were gradually lost; and when the entire cerebellum was removed the animal was totally unable to perform regulated movements. Bouillaud makes the important remark, that the phenomena differ accordingly as the cerebellum

* Recorded by Dr. Magnus in Müller's Archives, 1837. See Br. and Foreign Med. Review, iv. p. 500.

† This is by no means a solitary case. Dr. Alison states that he has met with several instances of the same kind; and quotes Sir C. Bell's Exposition, p. 212, and his Appendix to papers on the Nervous System, p. 120. The latter case was communicated by Dr. Abercrombie. (Outlines of Physiology, p. 361.)

is irritated or destroyed. If the cerebellum be only irritated, he says, its functions are not destroyed, but are thrown into confusion; and there are jumping, falling heels over head, whirling, and all the puzzling movements, (p. 135,) which are executed with such impetuosity that the eye cannot follow them. Sometimes the motions are like those of the epileptic. Magendie found that animals, when wounded in the cerebellum, made an effort to advance, but were immediately compelled to retrograde.

138. The last mentioned physiologist is much more remarkable for the number and variety of his experiments, than the accuracy or comprehensiveness of his inferences; and I think it is one of his errors to infer that certain parts of the brain subserve to movements in definite directions. These experiments are certainly much more in favour of Bellingeri's views of muscular antagonism. Section of a *crus cerebelli* cuts off the communication of the cerebellum with one-half of the body, and paralyses it; the opposite side consequently is not antagonized, and an instinctive muscular effort is concentrated upon the corresponding muscles, and throws them into violent action. It must also be remembered that the motor fibril, along which the will acts, are still uninjured; and this will modify the results very extensively. It is perhaps from loss of control over the muscles that we have the motion forwards in section of *corpora striata*, for our will acts as frequently to resist the instinctive movements as to assist them; indeed it is upon this power that moral responsibility is founded. It may also be remarked, that reflex movements are more readily excited in proportion as the mass of nervous matter is diminished, to which the peripheral changes are propagated. This is probably the reason why, when the spinal cord is divided in the loins, reflex movements are so much more readily excited in the lower extremities than in the upper, still in connection with the cerebral mass. Something similar may occur in separation of the spinal cord from the cerebellum.

139. Pathological anatomy confirms experimental physiology. Dr. Foulmouche, in a paper published in the Memoirs of the Royal Academy of Medicine, gives many instances of horses having a total inability to move forwards, or an uncontrollable propensity to move on; these symptoms were connected with inflammation of the arachnoid covering the cerebellum, *medulla oblongata*, and *tuber annulare*. He mentions similar instances in the human subject, and adopts a modification of Magendie's doctrines. Andral mentions a case of cancer of the cerebellum, in which there was a momentary retroflection of the head and trunk.* A man affected with rapid rotation of the head and paralysis died in the Hotel Dieu. He had a small tumour on the *tuber annulare*, which adhered to the cerebellum.† A child had a curious movement of the head alternately from right to left, and *vice versa;* a cyst was found

* Lectures in Lancet, ii. 1836, p. 102. † London Med. Gazette, xv. 143.

in the right lobe of the cerebellum, which contained numerous calculi.* A child, aged 3 years, had a peculiar unsteadiness in walking, and want of control over its arms in attempting to lay hold of anything. In the posterior part of each lobe of the cerebellum there were two tubercles of the size of walnuts, and the cerebellum was extensively softened.† Serres stated to the Royal Academy of Medicine, that, in four cases of chorea, he found the *tubercula quadrigemina* altered. An individual was unable to walk, there were frequent convulsions; and intelligence, respiration, deglutition, and articulation, were all imperfect. The *corpora olivaria* and *mammillaria*, and the *crus cerebelli*, were in a state of cartilaginous hardness.‡ A female, aged 35, had cephalæa, tremulous walk, and hysterical symptoms; a tumour was found at the base of the cerebellum, springing from both lobes, and descending into the spinal canal as far as the sixth nerve.§ In twenty epileptic patients, there was not one in whom the cerebellum was not much smaller and softer than usual.‖

140. Symptomatology furnishes us also with corroborative facts. Chorea is frequently accompanied by occipital pain, (see p. 111,) and in most convulsive diseases, frontal headache is experienced, which is an almost inseparable companion of irritation of the cerebellum, or parts in connection with the ganglia of nutrition.

141. Those poisons which produce symptoms resembling those of hysteria act upon the same structures. M. Flourens has shown by experiments that belladonna acts on the *corpora quadrigemina* (see p. 124,) and *nux vomica*, alcohol, the ethers, camphor, &c., on the cerebellum; each substance (according to him) leaving marks after death which distinguish the affected organ.¶ He confines the action of henbane, lactuca, and opium, to the cerebral lobes; but it is certain that opium acts on the whole nervous system, as is demonstrated by the state it induces in frogs analogous to that excited by strychnine. In a case of poisoning by *nux vomica*, related by Orfila and Ollivier, there was found much serous effusion over the cerebellum, and its structure was softened.** It is exceedingly probable that all poisons act upon the same structures. (108.)

142. With regard to the special action of the generative organs upon the respiratory ganglia and their connections, I conceive it is exceedingly analogous to that of the foreign substances just mentioned. It is a natural agency, which (unlike the preceding) is continuous and permanent. Hence permanent changes in the structures mentioned, p. 68, sqq.

143. There is, therefore, no special phrenological organ of phy-

* Andral, Clinique Med. v. 720.
† Dr. Abercrombie, op. cit. p. 78.
‡ Ibid. Appendix, Case xviii.
§ Ibid. Case i.
‖ Greding's Med. Aphor. in App. to Crichton on Mental Derangement, ii. p. 425.
¶ Revue Med. Jan. 1824.
** Christison on Poisons, p. 642. 1st ed.

sical love; and the cause of any preternatural development of the passion must be sought for in some change in the generative organs, or the special ganglia with which they are connected. That a morbid state of these may excite a secondary morbid state in the nervous centres under consideration, is highly probable, and might, I think, be readily demonstrated. But poisons will produce the same. All the arguments in support of Gall's doctrine, which are based on the magnitude of the cerebellum, are inconclusive, because, in all animals, it is as proportionate to the activity of the vital movements of the system in general, as of the generative organs in particular. Compare, for instance, the difference in the magnitude of the cerebella of birds and reptiles with the difference in the number and complexities of the movements of conservation and reproduction exhibited by the two classes. In the one, the tending of the young requires the exercise of various powers; in the other, a hole is scratched in the sand for the egg. Men with large cerebella are remarkable for the large development of the muscular system as their sexual properties.

144. The sexual stimulus excites the whole system as much as opium or arsenic; and in frogs induces a state of tetanic sensibility, exactly similar to that excited in them by opium or strychnine; a circumstance which has been made available in conducting vivisections of these animals. I have already referred to one or two psychological phenomena resulting from this stimulus (see p. 95); in general it developes an exalted and pleasurable perception of the system of the rythym of sounds, colours, and time. The song and more brilliant colour of male birds have this sexual relationship to the generative instinct of the hen-bird; and we even perceive the same general law acting upon mankind. It is an observation of Lacon, confirmed by daily experience, that love makes many rhymers. The agency of the music and dance of the ball-room, on the sexual passion, is well known; and a homely proverb (which must surely be heretical) has linked the fair in the same breath with mackerel, in saying that they are caught by red. (See p. 143, note.) There cannot be a doubt that there are psychical as well as vital stimuli of the action of which we are quite unconscious.

145. Having thus attempted to ascertain the seat of these diseases it only remains to inquire into their nature. It is very obvious that the term hysteria is altogether inapplicable to the varied forms of disease which I have made the subject of analytical investigation. The terms nervous diseases and nervous affections are equally vague, as we may readily discover by attempting to arrange them in their proper place, in the nosological systems of Linnæus, Vogel, Sagar, Sauvages, Cullen, Macbride, or Good.

146. We find, however, that they present two distinguishing characteristic: 1, an increased affectibility of the nervous system: 2, a morbid state of the blood. The former, perhaps, is most fre-

quently dependent on the latter, but, unquestionably, the affectibility is frequently a predisposing and exciting cause of the morbid state of the circulating fluid.*

147. The affectibility of the nervous system may be either local or general; it may be seated in the right or left half of the body; in a single ganglion, or in the whole series; or in nerves of physical, or of conscious sensation.

148. When the affectibility is local, its cause has only a limited sphere of action. Thus structural or functional disease of the liver will originate affectibility of the supra-scapular nerve, (see p. 128,) of the skin corresponding to it, or of the right arm; so will disease of the heart excite affectibility of the sensitive points on the anterior and posterior median line of the thorax, (see p. 118, note, 119,) or of the nerves of the arm; so also will disease of the bladder affect the lumbar sensitives nerves. (88.) In these and similar cases, it is of importance to observe that the diseased viscus excites a state of the spinal cord, so that the changes originating in the peripheral point of a sensitive nerve are magnified, as it were, when passing through the affected portion, on their way to the *sensorium commune* (43). Physical sensation may likewise be thus exalted or diminished (88); and this is the mode in which counter-irritants and other local remedies act when applied to the skin.

149. This principle admits of extensive application to diagnosis and therapeutics. For instance, an individual suffering from exhaustion and confined to bed, experiences diminished irritability of the bladder; there is no physical sensation excited, and it becomes painfully distended. Under these circumstances, a Lytta-plaster applied to the sacrum for half a hour, or an hour, will act upon the spinal cord, so as to excite such affectibility of both the motor and sensitive nerves, that the usual sensation shall be felt, and contraction of the bladder follow. It is by the same principle we can explain and make a correct diagnosis of the various local neuralgiæ and convulsions enumerated in my previous chapters; and, lastly, it is by this principle that we understand how the ovaries excite those symptoms of hysteria connected with the dorso-lumbar portion of the cord.

150. There may be general affectibility originating in a morbid state of the sensory tracts just before they terminate in the cranial ganglia, or in the ganglia themselves; according to the principle laid down in section 43. A morbid state of the blood is, in the latter case, a cause of the general affectibility. It may also be the cause of local neuralgiæ, when a morbid local state is grafted on the general cachexy.

* Perhaps good general terms for these diseases would be *neuræmia* and *neuræmious* (νευρον and αιμα), restricting their application to the functional diseases of the nervous system, *dependent* on the efficient causes mentioned above, and comprising *hypochondriacal* affections. Greek midwives, according to Galen, were the first who used the term Hysteria.

151. There is also a general state of the nervous system recurring at regular periods, according to some general law; when it is more affectible, and when, consequently, all causes of anormal motions and sensations act with more facility and energy. The most important periodic movements in the system are the quotidian and heptaperiodic.

152. The most obvious quotidian movement is indicated by the necessity for sleep, and the period of its continuance may be subdivided into two distinct portions. The first commences about midnight (sooner or later according to the habits of the individual), and continues until two, three, or four o'clock in the morning; when the second portion begins and continues until six. During both these, the cerebral ganglia are affectible; but it is in the first that asthma and other paroxysmal diseases of the respiratory organs make their attacks; and in the second that cholera, asphyxia, and other intestinal affections commence.

153. The heptaperiodic movement may be observed in almost every disease; upon it is based the doctrine of critical days in fevers; it is clearly shown in all nervous diseases in which there are well-marked symptoms, and which do not affect materially the general health; but it is most distinctly marked in the phenomena of development and reproduction.

154. The septennial phases of existence in man have been recognised by many observers, both ancient and modern, but numerous modifying circumstances render the observation of them difficult. It is in the phases of fœtal life that these periodic movements of the system may be best ascertained; and it is remarkable to observe, how invariably the transition from uterine to independent existence occurs in various classes of animals at hebdomadal periods or multiples. The following brief table of the periods of gestation and incubation in various animals illustrates this fact; and the list might be much more extended if naturalists would be exact in noticing the time to the half or even a-fourth of a week.

1½ Weeks. Humming-birds.	2 Weeks. Canary and other small birds.	3 Weeks. Raven, hen, and most birds.	4 Weeks. Duck, goose.	4½ Weeks. Rabbit, hare.	6 Weeks. Ferret, cat, Swan.
9 Weeks. Bitch, Isates.	4 Months. Sow.	5 Months. Lioness, ewe, Chamois.	6 Months. Brown bear.	7 Months. Porcupine.	8 Months. Rein-deer, hind, Fallow-deer.
9 Months. Cow, Nylghau.	12 Months. Camel, ass, mare, buffalo.				

155. The doctrine that there are mensual movements in man, as well as in woman, is rather ridiculed in England, but many continental writers have advocated it, and it was well known to the ancients. The same circumstances which have prevented a clear perception of the septennial movements, have also interfered more particularly in temperate climates to prevent us obtaining an exact knowledge of the mensual in man. It is however clearly marked

in the heptaperiodic recurrence of various well-marked nervous disease, as lunacy, epilepsy, &c. and in some hemorrhages.*

156. It is, however, universally acknowledged to happen in woman, because the menses present a visible sign of its existence, and one which cannot be confounded with any other. In the female of inferior animals the analogous heptaperiodic movement is accompanied by exalted sexual appetite, if the powers of the generative organs be not already divested to the nourishment of the young animal. In women, this state of the system predisposes to conception as well as to attacks of the nervous affections I have endeavoured to illustrate. (144.)

157. Much stress has always been laid upon the state of the menstrual discharge, both by medical men and females themselves, and, in many instances, with very erroneous views of its relation to the general health. Its due flow indicates that the heptaperiodic movement is normally performed, as regards the uterus at least; and its suppression is a sign that the movement is deranged or irregular, but, I think, is rarely a cause of the irregularity, it being seated in the nervous centres or depending upon a morbid state of the blood. And so, also, when after suppression, the menses reappear, we are in error when we say the flow is the *cause* of the returning health; it is simply a *sign* that the periodic movement is normally performed; and, consequently, that the system has recovered its healthy tone. It therefore differs in no degree from other signs of returning health, as manifested when the secretions from the kidneys, bowels, &c., become normal; only it is more tangible, more evident, and more observed from habit and custom.

158. The same remarks apply, of course, to other secretions. Suppressed urinary secretion in hysteria is not a cause but an effect of a morbid state already existing; although the retained urea may act secondarily as an injurious agent, and is also in other morbid states of the viscera. (See p. 109.) These remarks are equally applicable, too, to profluvia. The secretion of flatus into the stomach is not a cause of disease but an effect of it. It occurs in all cases of local affectibility depending on visceral excitement, as by diseased heart. (148, and see p. 120.) Illustrations of these principles I must leave to the experience of the reader.

159. The left half of the nervous system is more affectible than the right; and, of course, all the structures in connection with it are more liable to disease. A series of accurate statistical observations are only wanted to enable us to make this principle extensively available in practice. We way predict, for instance, that disease will appear in the left tonsil, left salivary glands, mammæ,

* It would be easy to fill two or three pages with references to cases of anomalous nervous affections, paroxysmal diseases, inflammations of various structures, and hemorrhages, recurring every 42 hours, or every 3½, 7, 14, 21, or 28 days, as well in men as women. Almost all treatises on nervous and intermittent diseases contain them. They are glaring instances of a general law, copious illustrations of which, I hope, ere long, to lay before the public.

or testes, sooner than in the right, in a person of cancerous diathesis. Some illustrations may be found in p. 78, 129. Numerical observations would furnish us with the laws which regulate the action of this principle.

160. The two ends of the spinal cord have some kind of antagonism. It would appear that the centrifugal action of mental emotions must necessarily be most exhibited on the parts in connection with the cranial cord, as it is the portion which is first affected, and which is in closest relation with the seat of the emotions. Illustrations of the connection which exists between the two ends of the cord, may be found in p. 105, and case of Hebditch, p. 118, note.*

161. As the cardiac symptoms of hysteria have not been noticed in this summary, before closing I would briefly state that the heart is subject to the same laws as other muscular structures. The lining membrane is supplied with nerves of special physical sense, the powers of which are exalted or destroyed by nervine alteratives of every class. Paralysis of the nerves is the cause of death in many cases of poisoning.† The motor or white nervous fibrils of the heart are derived from the spinal cord as well as the sympathetic; and are analogous in structure to spinal motor nerves. (Müller.) The heart being developed from the vascular layer of the embryo (which is derived from the serous and mucous layers), it must partake in some degree of the properties of both the voluntary and involuntary systems. It is thus, that, like portions of intestine, the heart acts after removal from the body, and thus, also, that a motor excitement traversing the spinal cord is propagated to the heart. We have consequently increased cardiac action commensurate with the excitement in the nervous centres; and it is thus that the pulse is quicker when standing than lying; the muscular efforts being greater in the former than in the latter posture.‡ Without indulging in numerous illustrations, we may confidently infer that the laws of affectibility are as applicable to the heart, *mutatis mutandis*, as to other sensitive and motor structures.

162. The question may be asked, what are the efficient causes of this affectibility? To answer it, we must first have ascertained the nature of the changes excited in the nervous system by will and force (33, 55, 56); the bio-chemical laws regulating vital mechanics; and the mutual action of the blood and neurine on

* In a case of neuræmious affection, (if I may be permitted to use the term,) recorded by Mr. Cockburn in the forty-sixth volume of the Edinb. Med. and Surg. Journal, this metastasis took place; and Dr. Craigie notices the fact, p. 32. There is a case in Med. Chir. Review, vii. p. 227, and another related by Dr. Abercrombie, op. cit. p. 73. With reference to the remarks in the text, it may be observed, that in the entomoid classes, the last abdominal ganglion is frequently as large as the supra-œsophageal or cerebral.

† Professor Müller makes some interesting observations on this subject, op. cit. p. 735.

‡ For recent notices respecting the alternation produced on the pulse by posture, &c., the reader is referred to Professor Müller's work, p. 741, and Dr. Guy's paper in Guy's Hospital Reports, No. for April last.

each other. But although at present the question cannot be solved, we need not despair of success. We are but beginning to apply the power of physical science to the investigation of vital laws; yet we have already conquered vast difficulties. The opinion of Ehrenberg, that the decolorized globules of the retina and similar parts, (36,) are formed directly from the blood globules, is curious.* Close microscopic observation of the changes produced in the blood-globules and the ganglia by nervine alteratives, would lead to important results; and afford a clue to the discovery of those originated by external and internal stimuli. The consideration of these subjects, and of the supposed remote causes of affectibility, as irregular distribution of the nervous fluid, congestion, irritation, &c., I leave to others.

163. In conclusion, I may be permitted to express my regret that this chapter should contain so many hypothetical views. However, I trust the reader will give me credit for attempting to apply them as much as possible to their legitimate use; namely, the orderly arrangement of facts. He will also consider that they have partly originated in our still very imperfect physiological knowledge; and I am not without hope, that he will find the principles I have advocated to be capable of daily application to the diagnosis and treatment of nervous affections in general.

* In the forty-eighth volume of the Edin. Med. and Surg. Journal, p. 288.

York, 10*th October*, 1838.

ANALYTICAL CONTENTS.

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THE END.

ARMY METEOROLOGICAL REGISTER.

METEOROLOGICAL REGISTER

FOR THE YEARS

1826, 1827, 1828, 1829, AND 1830;

FROM

OBSERVATIONS

MADE BY THE SURGEONS OF THE ARMY AND OTHERS

AT THE

MILITARY POSTS OF THE UNITED STATES.

PREPARED UNDER THE DIRECTION OF

THOMAS LAWSON, M.D.,

SURGEON-GENERAL UNITED STATES ARMY.

Philadelphia:

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1840.

REMARKS.

In 1819, under the direction of the then Secretary of War, a system of meteorological observations was commenced, and zealously prosecuted by the late Surgeon-General; but as the instruments provided never exceeded a thermometer and a rain-guage, the observations, including those upon the course of winds, and other obvious states of the weather, have necessarily had a limited range. The results are consequently less comprehensive than the present state of meteorological science demands. As temperature is, however, the most prominent, and perhaps the controlling, element in the constitution of climate, and as thermometrical observations have been continuously made for twenty years, it would seem a matter of common right that these at least should be placed within reach of the scientific public.

The Meteorological Abstracts, which have served as the basis of the general conclusions deduced, do not embrace more, perhaps, than a third of the materials collected in the Surgeon-General's office. As the observations presented, however, extend over the entire domain of our States and Territories, it may reasonably be assumed that the results exhibit a fair expression of the general laws of our climate, which further research will ultimately confirm.

As meteorology has now become a subject of general interest, the importance of more extended observations is apparent; and the hope is indulged that the medical corps of the army, more especially as many of the military posts afford an opportunity of making observations in regions still in a state of nature, will ere long be furnished with the means of prosecuting more extensive researches, and of keeping pace with the progress of the science.

To the late Surgeon-General, J. Lovell, M.D., under whose efficient control the Medical Bureau was organized, and improved with a steady pace in its various details, pertains the merit of having established a system of reports, thus rendering it practicable to condense the results of years into the forms now presented.

The unpublished records extend as far back as 1820, the period when regular observations were first instituted. In 1826, the late Surgeon-General published Meteorological Abstracts for the years 1822-3-4-5, embracing positions in every region of the United

States. Tables for 1820 and 1821 were also published; but a want of uniformity in the mode of tabular arrangement, has, in a measure, defeated their object.

By direction of Thomas Lawson, M.D., Surg.-General U. S. A., the papers on file in the Medical Department relative to meteorology have been lately examined and arranged. "Diaries of the Weather," from 1820 to 1830 inclusive, have been condensed into tabular abstracts; the last five years being now presented in monthly results.

The thermometrical observations are confined to the superficial temperature of the places; and as the mean of each month is calculated from 90, and of each year from 1095 observations, the tables, it is believed, will give an approximation to the truth as near as can be realized by ordinary observation, and a mean sufficiently correct for every contemplated purpose.

The climate of the United States may be studied under three grand divisions; each of which contains many sub-divisions or systems of climate, determined by the influence of local causes. 1st. The Northern Division, extending as far south as the 39th degree of latitude, a region characterized by the predominance of low temperature. 2d. The Southern Division, in which a high temperature prevails; and 3d. The Middle Division, which exhibits phenomena vibrating to both extremes. These divisions will be regarded, in a great measure, as arbitrary, and are intended, as well to facilitate description, as to express the operation of general laws.

In reference to the sixty-five tables, embracing a period of five years, it may be necessary to remark, that the first twelve tables of each year give the mean of the observations of each month, and the thirteenth, the mean for the whole year. These tabular abstracts are the condensed results of the observations made at various posts, situated between 27° 57′ and 46° 39′ of north latitude, and between 67° 04′ and 95° 43′ of longitude west of Greenwich; embracing an extent of 18° 42′ of latitude, and 28° 39′ of longitude.

The first general division presents the greatest variety of climate. On the sea-coast of New England, the influence of the ocean modifies the range of the thermometer and the mean temperature of the seasons. Advancing into the interior, the extreme range of temperature increases, and the seasons are violently contrasted. Having come within the influence of the lakes, a climate like that of the sea-board is found; and proceeding into the region beyond the modifying agency of these inland seas, an excessive climate is again exhibited. The variations of the *isotheral* and *isocheimal* curves —the lines of equal summer and of equal winter temperature—thus afford a happy illustration of the equalizing tendency of large bodies of water. Hence the former division of the surface of the earth into five zones, as regards its temperature, has been superseded, in scientific inquiries, by a more precise arrangement; places having

the same mean temperature are connected by isothermal lines—the spaces between them are called isothermal zones.

A concise description of the chain of vast lakes or inland seas, which lie in the northern division, may be here properly introduced. The basin of the St. Lawrence is truly a region of "broad rivers and streams," containing, it is estimated, an area of 400,000 square miles, of which 94,000 are covered with water. From the western extremity of Lake Superior to the Gulf of St. Lawrence, the distance is about 1900 miles. These ocean-lakes have been estimated to contain 11.300 cubic miles of water—a quantity supposed to exceed more than half of all the fresh water on the face of the globe. Lakes Huron and Michigan, which have the deepest chasms, have been sounded to the amazing depth of 1800 feet without discovering bottom.

The following table, which gives the mean length, breadth, depth, area, and elevation of these several collections of water, is taken from a recent report made by Douglas Houghton, Esq., State Geologist of Michigan:—

	Mean Length. *Miles.*	Mean breadth. *Miles.*	Mean depth. *Feet.*	Elevation above level of the sea. *Feet.*	Area in square miles.
Lake Superior	400	80	900	596	32,000
Green Bay	100	20	500	578	2,000
Lake Michigan	320	70	1000	578	22,400
Lake Huron	240	80	1000	578	20,400
Lake St. Clair	20	18	20	570	360
Lake Erie	240	40	84	565	9,600
Lake Ontario	180	35	500	232	6,300
St. Lawrence . . .			20		940
					94,000

Having said that the northern division exhibits four striking inflexions of the isotheral and isocheimal lines on the same parallel of latitude, corresponding to certain systems of climate, the data from which these results are obtained will now be given; and the results of each year will be presented in detail. To illustrate the difference of temperature, more especially as regards its distribution among the seasons, between the sea-board and the interior remote from large bodies of water, a comparison of the following posts will be instituted:

Fort Sullivan, lat.	44° 41′	Fort Snelling, lat.	44° 53′
" Wolcott, "	41° 30′	Council Bluffs "	41° 25′
Mean East	43° 06′	Mean West	43° 09′

The data given in the following table are contained in the first twelve Abstracts for 1826; and, for brevity's sake, the terms east and west will be used to distinguish the Atlantic and the interior posts, whilst the latitudes given will be regarded as means of the eastern and western posts respectively.—See Table [A] p. 8.

[A]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						31.22	28.17	28.17	35.07	41.82	56.77	62.15	69.61	69.39	62.76	52.18	40.38
						24.98	17.57	19.89	32.15	42.86	69.24	74.22	75.40	72.49	59.03	53.17	38.94
Atlantic	43° 6′	48.18	98	–24	122	29.19			44.55			67.05			51.92		
Interior, remote from Lakes . .	43° 9′	48.83	104	–23	127	20.81			48.08			74.04			50.38		

[B]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						23.41	18.93	17.66	26.32	32.85	50.59	61.14	66.74	63.29	54.84	48.63	35.60
						19.15	13.09	16.15	29.60	37.68	66.76	72.05	73.85	70.24	55.32	49.13	35.29
Fort Mackinac . .	45° 51′	41.67	84	–17	101	20.00			36.59			63.72			46.36		
Fort Snelling . .	44° 53′	44.86	92	–23	115	16.13			44.68			72.05			46.58		

During the winter, the mean of the east is 8.38 *higher* than the west ; during the spring, 3.53 *lower*; during the summer, 6.99 *lower*; and during the autumn, 1.54 higher. In the mean temperature for the year there is but a fractional difference. In the extreme range of the thermometer there is a difference of 5°; but an examination of each month shows the range to be much greater at the interior posts remote from the agency of inland seas.

Lest this striking contrast between the mean temperature of winter and that of summer might be ascribed to the *elevation* of the western posts (being 6 or 700 feet above the level of the sea), a comparison between Forts Mackinac and Snelling, the former situated on the Island of Mackinac, and the latter near the junction of the St. Peters and Mississippi Rivers, will be conclusive upon this point. See Table [B] p. 8.

During the winter, the mean of the former, although 1° north, is 3.87 *higher* than the latter; during the spring, 8.09 lower; during the summer, 8.33 *lower;* and during the autumn nearly equal. As these two posts present little difference of elevation above the level of the ocean, and are in comparative proximity, the fact—that the winters are less rigorous and the summers more temperate, on the Great Lakes—is demonstrated to be owing, as on the ocean, to the equalizing agency of large bodies of water.

The Abstracts of 1827 furnish results corroborative of those of the preceding year. In comparing the Atlantic stations with those in the interior remote from inland seas, the following posts are taken:—

Fort Preble,	lat. 43° 38′	Fort Snelling,	lat. 44° 53′
„ Constitution	„ 43° 04′	„ Armstrong	„ 41° 28′
Mean East	43° 21′	Mean West	43° 10′

—See Table [C] p. 10.

During the winter, the mean of the E. is 2.27 *higher* than the W.; during the spring, 3.85 lower; during the summer, 8.26 *lower;* and during the autumn, 1.71 lower. At the W. the mean temperature of the year is 2.88 higher; and the extreme range of the thermometer is 15° greater.

A comparison between Forts Brady and Snelling, in relation to the influence of the Great Lakes, furnishes results confirmatory of those of the preceding year. See Table [D] p. 10.

During the winter, the mean of the former, although 1° 46′ north of the latter, is 1.76 *higher;* during the spring, it is 8.09 lower; during the summer, 9.84 *lower;* and during the autumn, 2.37 lower. At Fort Snelling the mean annual temperature is 4.64 higher, and the extreme range of the thermometer is 14° greater.

[C]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						28.58	20.48	25.72	34.72	47.18	53.99	62.33	68.85	65.90	60.98	50.97	33.21
						20.37	19.50	28.11	36.08	47.97	63.38	72.13	76.22	73.50	64.22	50.76	35.31
Atlantic	43° 21′	46.08	95	–8	103	24.93			45.30			65.69			48.39		
Interior, remote from Lakes . .	43° 10′	48.96	96	–22	118	22.66			49.15			73.95			50.10		

[D]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						20.33	17.36	22.73	25.85	39.39	49.92	59.68	63.60	63.57	58.87	45.12	31.15
						13.01	17.26	24.86	31.74	44.76	62.93	71.95	74.06	70.35	61.02	49.26	31.99
Fort Brady	46° 39′	41.46	84	–20	104	20.14			38.39			62.28			45.05		
Fort Snelling . .	44° 53′	46.10	96	–22	118	18.38			46.48			72.12			47.42		

Having demonstrated three systems of climate, viz.; that of the Atlantic Coast and of the Lakes, which have the extremes of temperature modified, and that of the region beyond the Lakes, characterized by strongly contrasted seasons, it is practicable, this year, by means of the thermometrical observations at West Point, to establish another system of climate. As the climate of the Lakes bears a close similitude to that of the sea-coast, so will this resemble that of the region beyond the Lakes. See Table [E] p. 12.

As West Point, New York, is on the same degree of latitude with Fort Trumbull (New London, Connecticut), and is distant only one and a half degree of longitude, no striking contrast in the results would be, *à priori*, anticipated. It is found, however, that the winters of the former are 4.67 colder, and the summer 1.00 warmer; and that although the mean annual temperature of Fort Trumbull is 1.56 higher, yet the heat is so equably distributed through the seasons that the difference between the mean temperature of winter and summer is only 35.89, whilst that of West Point is 41.56. It is thus seen that the isotheral and isocheimal lines, on leaving the coast, gradually diverge until they come within the influence of the Lakes, when they again converge; and that, having passed beyond the controlling power of these inland seas, their inflexions are once more in adverse directions. Hence it is apparent, that although two places may have the same mean annual temperature, and thus be on the same *isothermal* line; yet, owing to the seasons being nearly uniform or violently contrasted, the climates may be very different.

The Abstracts of 1828 furnish the usual results in regard to the equalizing influence of the Ocean and the Lakes. In the following table, a comparison is made between the same stations as in the prior year. See Table [F] p. 12.

During the winter, the mean of the Atlantic posts is 8.70 higher than that of Forts Snelling and Armstrong; during the spring, it is 2.43 lower; during the summer, 6.90 lower; and during autumn 0.80 higher. In the mean annual temperature, there is but a fractional difference; but the extreme range of the thermometer is 23° greater in the West.

The results obtained from a comparison of Forts Brady and Snelling, confirm the conclusions of prior years. See Table [G] p. 13.

During the winter, the mean temperature of the former is 3.47 higher than the latter; during the spring, it is 2.75 lower; during the summer, 12.61 lower; and during the autumn, 3.08 lower. At Fort Brady the difference between the mean temperature of winter and summer is 40.79, whilst at Fort Snelling it is 56.87.

Between West Point and Fort Trumbull the comparison is found also to quadrate with the general law.

[E]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						34.95	23.31	31.87	40.58	54.66	61.94	69.27	72.98	72.57	65.48	54.45	37.90
						42.24	27.15	34.73	42.35	53.15	59.00	67.25	73.16	71.39	66.75	58.16	41.85
West Point . . .	41° 22′	51.66	101	–10	111	30.04			52.39			71.60			52.61		
Fort Trumbull . .	41° 22′	53.10	88	0	88	34.71			51.50			70.60			55.59		

[F]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						33.72	28.20	34.61	35.48	43.46	56.05	65.68	70.00	69.51	62.21	49.75	40.99
						29.17	17.35	23.94	33.96	46.64	61.15	73.68	76.62	75.59	59.88	52.20	38.03
Atlantic	43° 21′	48.90	92	–2	94	32.18			44.83			68.40			50.82		
Interior, remote from Lakes . .	43° 10′	49.15	95	–22	117	23.48			47.26			75.30			50.02		

[G]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						23.74	18.43	20.33	28.73	39.35	61.23	52.80	67.20	64.86	54.85	45.53	34.50
						24.87	10.42	16.80	32.24	45.04	60.28	71.82	76.40	74.46	58.83	50.12	35.18
Fort Brady	46° 39′	42.38	91	-20	111	20.83			43.10			61.62			44.96		
Fort Snelling. . .	44° 53′	46.34	92	-22	114	17.36			45.85			74.23			48.04		

[H]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						39.67	33.42	39.39	41.77	47.72	61.76	73.85	75.41	76.58	68.64	55.99	45.03
						45.66	41.86	44.33	43.20	48.86	59.43	70.10	74.57	74.84	69.30	58.04	51.54
West Point . . .	41° 22′	54.96	98	6	92	37.49			50.42			75.28			56.55		
Fort Trumbull .	41° 22′	56.89	86	18	68	43.95			50.50			73.20			59.63		

2

During the winter, the mean of the latter is 6.46 higher than the former; during the spring, it is 0.08 higher; during the summer, 2.08 lower; and during the autumn, 3.08 higher. At West Point, the range of the mercury is 24° greater than at Fort Trumbull.

The Abstracts of 1829 next come under notice. It will be seen that the data of this year lead to the same unvarying conclusions as in all former calculations. See Table [I] p. 15.

During the winter, the mean of the E. is 7.55 higher than the W.; during the spring, 5.41 lower; during the summer, 8.38 lower; and during the autumn 0.33 higher. On the ocean the range of the thermometer is 28° less than in the opposite locality.

The meteorological report from Fort Brady being imperfect, the usual comparative views are precluded. The establishment of a new post, however, at Houlton, in the interior of Maine, allows a more extended inquiry into the system of climate peculiar to the region lying between the sea-coast and the Lakes. The following posts constitute the points of comparison:—

Fort Preble, Maine	43° 38′	Hancock Barracks, Me.	46° 10′
" Constitution, N. H.	43° 04′	West Point, N. York,	41° 22′
Mean lat.	43° 21′	Mean lat.	43° 46′

—See Table [K] p. 15.

During the winter, the mean of the coast is 4.32 higher than the interior; during the spring, 1.49 lower; during the summer, 0.90 lower; and during the autumn, 1.73 higher. On comparing the posts separately, the difference between the summer and winter temperature becomes more apparent. Thus, at Hancock Barracks, it is 47.49, and at Fort Preble 41.66; and at West Point 41.14, and at Fort Constitution 36.55. The extremes of temperature are also indicated by the range of the thermometer; for, whilst the thermometer at Hancock Barracks rises in the summer to 92°, and sinks in the winter 24° below zero, it attains at the Atlantic posts but the same height, and sinks no lower than 6° minus 0.

Lastly, the Abstracts of 1830, (which year constitutes the limit of the present investigation,) come under review. On a comparison of the Atlantic region with the interior beyond the Lakes, using the data of the same posts as in the preceding year, no variation is presented in the results. See Table [L] p. 16.

During the winter, the mean of the E. is 3.23 higher than the W.; during the spring, 5.60 lower; during the summer, 9.67 lower; and during the autumn, 3.01 lower. At the west, the range of the mercury is 14° greater; and, whilst the difference in the mean temperature of summer and winter is 53° 63′, it is but 40.77 on the Atlantic coast.

Resuming the comparison between Forts Brady and Snelling, the deductions of former years are confirmed. See Table [M] p. 16.

[I]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						39.60	22.59	21.72	31.06	43.96	56.46	63.58	66.85	65.72	55.40	48.37	38.36
						29.84	20.86	9.96	31.21	48.88	67.62	73.88	74.30	73.11	60.35	52.62	28.47
Atlantic	43° 21′	45.71	92	–6	98	27.77			43.83			65.38			47.38		
Interior remote from lakes . . .	43° 10′	47.59	96	–30	126	20.22			49.24			73.76			47.15		

[K]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						34.60	22.54	21.71	31.06	43.96	56.46	63.58	66.86	65.72	55.90	48.37	38.36
						27.45	19.48	18.99	30.06	45.52	60.37	65.68	66.29	66.90	54.95	47.68	34.32
Atlantic	43° 21′	45.72	92	–6	98	26.29			43.83			65.39			47.38		
Interior, &c. . .	43° 46′	44.81	92	–24	116	21.97			45.32			66.29			45.65		

[L]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						32.90	21.43	22.04	34.74	47.40	53.59	62.59	69.49	66.62	57.91	50.84	45.28
						21.01	18.82	26.99	37.59	53.89	61.04	71.29	81.51	74.90	60.78	55.87	46.39
Atlantic	43° 21′	47.07	94	–16	110	25.46			45.24			66.23			51.34		
Interior remote from lakes . . .	43° 10′	50.92	98	–26	124	22.27			50.84			75.90			54.35		

[M]

PLACES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						24.66	13.19	18.67	27.92	46.18	48.48	59.35	71.00	62 33	55.22	49.50	44.08
						15.64	14.18	23.60	34.00	51.77	59.70	70.31	81.66	73.21	58.70	54.74	42.79
Fort Brady . . .	46° 39′	43.38	93	–26	119	18.84			40.86			64.23			49.60		
Fort Snelling . .	44° 53′	48.60	94	–26	120	17.81			48.39			75.06			52.08		

During the winter, the mean of the former is 1.03 higher than the latter,—a difference, which would be much increased were November instead of February taken as a winter month; during the spring, the mean is 7.53 lower; during the summer, 10.83 lower; and during the autumn, 2.48 lower. It thus appears that although Fort Brady, situated at the Sault St. Marie, near the outlet of Lake Superior, is 1° 46′ north of Fort Snelling, at the junction of the St. Peter's and the Mississippi, yet there is a difference of nearly 11° in their isotheral lines.

Of the four subdivisions in the northern region of the United States, two are characterized as *modified* climates and two as *excessive*. With the view to test the accuracy of this proposition in a general comparison, one post has been so selected from each system of climate, that the mean latitude shows a difference of but 15′. Thus, the following stations constitute the points of comparison in the subjoined table:—

Fort Brady, 46° 39′	Hancock Barracks, 46° 10′
" Wolcot, 41° 30′	Fort Armstrong, 41° 28′
Mean lat. 44° 04′	Mean lat. 43° 19′

—See Table [N] p. 18.

During the winter, the mean of the former is 4.12 higher than the latter; during the spring, it is 3.97 lower; during the summer, 4.30 lower; and during the autumn there is but a fractional difference. Between winter and spring the modified climate shows a mean difference of 18.49, whilst that of the excessive climate rises to 26.52; and between winter and summer, it is in the former 41.17 and in the latter 49.59. The table indicates little difference in the extreme range of the thermometer; but, on reference to Abstract No. XIII. for 1830, it will be found that Fort Armstrong, the most *southern* post, exhibits the *highest* range. This phenomenon, which is owing to the circumstance that the position is farthest removed from the agency of large seas, shows that latitude alone constitutes a very uncertain index of the character of climate.

The investigation of the northern division will be now concluded, by giving several abstracts, showing the mean result of the five years' observation. The following table affords a condensed view of all the comparisons instituted between the sea-board and the region beyond the Lakes. See Table [O] p. 18.

During the winter, the mean of the former is 6.05 higher than that of the latter; during the spring, 4.13 lower; during the summer, 8.71 lower; and during the autumn, 0.40 lower. As the winters are colder and the summers warmer in the latter region, it is also shown that the extreme range of the thermometer is 12° greater.

[N]

CLIMATES OF OBSERVATION.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						31.13	21.33	23.10	32.91	46.36	51.71	61.60	70.67	65.28	57.98	51.96	45.05
						26.08	15.20	21.91	34.32	51.14	57.42	66.51	74.74	70.49	58.42	52.25	44.07
Modified	44° 04′	46.58	93	-26	119	25.18			43.67			66.35			51.66		
Excessive	43° 49′	47.76	98	-24	122	21.06			47.60			70.65			51.57		

[O]

PLACES OF OBSERVATION.	Mean Latitude.	Mean Annual Temperature.	Range of the Thermometer			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						33.20	24.18	26.45	34.21	44.76	55.37	63.26	68.96	67.43	59.85	50.42	39.73
						25.07	18.82	21.78	34.20	48.05	64.49	75.04	76.81	73.92	60.85	52.92	37.43
Sea-coast	43° 18′	47.19	98	-24	122	27.94			44.78			66.55			50.00		
Region beyond the lakes . . .	43° 10′	48.99	104	-30	134	21.89			48.91			75.26			50.40		

Deeming it unnecessary to give the course of the winds and other states of the weather for each year, an abstract for the whole period is now presented.* See Table [P] p. 20.

The ratios between the seasons on the Atlantic coast and the interior remote from large bodies of water, based on five years' observation, have been thus reduced to numerical expressions. Although fair weather prevails in both regions, a marked difference obtains in regard to the relative proportion. On the sea-coast, the annual ratio of fair days is 202, and in the opposite locality 240; the cloudy days are as 108 to 77; the rainy days are as 45 to 31; and those of snow are as 9 to 16. These ratios, far from being accidental, result from the operation of fixed laws. As the annual quantity of rain depends upon the amount of evaporation, it increases, as a general rule, in proportion as the equator is approached; and in regard to the seasons, the greatest amount falls when the mean monthly temperature is highest. As this augmented quantity in warm maritime countries falls at a particular season, and in a shorter space of time, than in colder regions, the annual number of dry days, particularly in inland districts, is proportionally increased. On the contrary, in the cold or temperate maritime localities now under consideration, different results follow. Although much less in annual quantity than in warmer regions, the rain descends much more frequently, but in slighter showers; and hence, a ready explanation is afforded of the fact, that the number of wet and foggy days on the New England coast is one-half greater than in the dry and cold region beyond the Lakes. Humboldt has given the following table as the proportional quantity of rain in different latitudes:—

Lat.	Mean annual depth of rain.
0	96 inches
19	80 "
45	29 "
69	17 "

In regard to a particular locality, much will also depend upon the prevailing winds; for it has been observed that the number of days in a year during which the winds blow from a certain point of the compass, at a given place, preserves a constant ratio. This follows from the fact that the force and direction of winds depend on general causes, such as the declination of the sun, the configuration of the coast, and the position of neighbouring continents. This fact is illustrated throughout the Abstracts generally. By way of example, the results of three years' observation at Fort Gibson, are annexed. See Table [Q] p. 20.

* As the proportion of winds and weather, throughout all the Abstracts, is calculated for the average of a month, the result for a year may be readily determined.

[P]

PLACES OF OBSERVATION.	Mean Latitude.	WINDS.									WEATHER.				
		N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cloudy.	Rain.	Snow.	Prevailing.
		Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Sea-coast	43° 18′	1.71	5.46	3.47	1.69	2.35	6.36	5.23	4.25	S.	16.89	9.09	3.77	0.79	Fair.
Region beyond the lakes	43° 10′	3.89	3.30	1.51	2.00	2.88	7.16	4.19	6.07	S.	20.04	6.46	2.60	1.36	Fair.

[Q]

FORT GIBSON.	WINDS.									WEATHER.				
	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cloudy.	Rain.	Snow.	Prevailing.
	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
1828	2.08	3.25	1.67	1.50	20.42	0.50	1.00	0.08	S.E.	19.00	9.25	2.08	0.17	Fair.
1829	2.67	3.08	4.83	1.58	13.50	1.17	2.58	1.00	S.E.	18.92	6.67	4.50	0.18	Fair.
1830	1.75	3.08	4.92	2.83	15.00	0.83	1.42	0.58	S.E.	19.17	6.67	4.17	0.42	Fair.

Comparing the seaboard with inland localities remote from Lakes, the contrast in the seasons of winter, spring, and summer, is very remarkable; and the influence of this difference of climate upon the animal economy and the vegetable kingdom, is no less striking; for, as Baron Humboldt remarks,—"a summer of uniform heat excites less the force of vegetation, than a great heat preceded by a cold season."

The following abstract furnishes a condensed view of the numerical results obtained from the preceding annual comparisons between localities in the interior,—the one being under, and the other without, the equalizing influence of inland seas. See Table [R] p. 22.

Fort Snelling, near the junction of the St. Peter's and the Mississippi, constitutes the latter place of observation, and the other point is a mean between Forts Brady and Mackinac, the former situated near the outlet of Lake Superior and the latter on the island of Mackinac. Three years' observations were made at the former and one at the latter. Although the latitude on the Lake is 1° 34' north of the other, and presents a mean annual temperature 4.25 lower, yet the mean winter temperature is 2.54 *higher;* during the spring, the mean temperature is 6.65 *lower;* during the summer, it is 10.40 *lower;* and during the autumn, 2.04 lower. These ratios show a contrast in the seasons no less striking than that exhibited on a comparison with the Atlantic coast. No objection can be urged against this comparative view on the ground of relative elevation, as Fort Brady is 595 feet, and Fort Mackinac 728 feet,* and Fort Snelling 780 feet above the level of tide water.

The following tabular statement of the course of the winds and the state of weather, based on the same years of observation as the abstract just given, will determine whether the agency of the Lakes induces the same meteorological relations, in this respect, as the ocean. See Table [S] p. 22.

On the Lakes, the annual ratio of fair days is 117, and in the opposite locality, 215; the cloudy days are as 127 to 73; the rainy, as 63 to 46; and the snowy as 45 to 29. In the former, the prevailing weather is cloudy, and in the latter it is fair. The ratio of cloudy days is even higher on the Lakes than on the Atlantic coast. As it is of great importance to determine the annual quantity of rain which falls on any point of the earth's surface, it is much to be regretted that more extensive observations have not been made at these posts on the pluviometer.†

* Fort Mackinac is elevated 150 feet above the surface of the Lake.

† Vide Note at end of "Remarks."

[R]

CLIMATES OF OBSERVATION.	Mean Latitude.	Mean Annual Temperature.	Range of the Thermometer.			WINTER.			SPRING.			SUMMER.			AUTUMN.		
						Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.
						23.04	16.98	19.85	27.20	39.44	52.56	58.24	67.13	63.51	55.94	47.19	36.33
						18.17	13.74	20.35	31.90	44.81	62.42	71.53	76.49	72.07	58.47	50.81	36.31
Inland seas	46° 27′	42.22	93	-26	119	19.96			39.73			62.96			46.49		
Remote from seas	44° 53′	46.47	96	-26	122	17.42			46.38			73.36			48.53		

[S]

PLACES OF OBSERVATION.	Mean Latitude.	WINDS.									WEATHER.				
		N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cloudy.	Rain.	Snow.	Prevailing.
		Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Inland seas	46.27	2.39	5.81	3.16	4.56	4.49	2.46	3.58	3.99	N.W.	9.79	11.58	5.27	3.79	Cl'dy.
Remote from seas	44.53	1.46	3.73	1.02	1.31	2.83	4.65	6.68	8.75	W.	17.96	6.15	3.89	2.44	Fair.

The meteorological phenomena of Canada, Nova Scotia, New Brunswick, and Newfoundland, according to the observations of the British Army Surgeons, are in perfect harmony with the laws just illustrated. In Canada, the climate exhibits such sudden alternations of temperature that the mercury at Quebec has been known to fall 70° in the course of 12 hours. Cold weather sets in as early as November, from the end of which month till May the ground remains covered with snow to the depth of three or four feet. When the winds blow with violence from the North-east, the cold become so excessively intense, that the mercury congealed in the thermometer serves no longer to indicate the reduction of temperature. During winter, the general range is from the freezing point to 30° below zero. The seasons do not, as in more temperate regions, glide imperceptibly into each other. In June, July, and August, the heat, which often attains 95° of Fah., is frequently as oppressive as in the West Indies.

The climate of Nova Scotia, although in similar latitudes, exhibits a striking contrast to that of Canada. The temperature is not only modified by its insular position, but the interior of the peninsula "is so much intersected by lakes and bays, that nearly one-third of its surface is under water." The thermometer seldom rises above 88° in summer, or sinks lower than 6° or 8° below zero in winter. Were it practicable to obtain the requisite data, it would be interesting to institute a comparison between the seasons of this region and those of Canada.

The climate of Newfoundland is similar to that of Nova Scotia. The summers, however, owing to the meeting of the icebergs on the coast, are less warm, of shorter duration, and subject to more sudden vicissitudes.

Having illustrated rather minutely the several systems of climate pertaining to the northern division, the necessity of similar details in reference to the other two divisions is superseded. It is the more unnecessary, as Abstracts A, B, C, appended to these "Remarks," will enable one at a glance to trace out the meteorological relations of any region of the United States. The first exhibits the mean temperature of each month, each season and the whole year; the second shows the difference between the mean temperature of each month and season; and the third contains the annual and monthly ranges of temperature. It will be found that the same laws prevail in the middle region of the United States as in the northern, viz., that the seasons grow less uniform in proportion as we recede from the sea-coast. Thus, Washington City and Fortress Monroe, on the one hand, show less difference between the mean temperature of summer and winter than Jefferson Barracks and Fort Gibson on the other; and in examining the annual range of the thermometer and the mean of the monthly ranges, similar contrasts are revealed. No reference was made to the latter mode of comparison in investigating the four systems of climate of the northern division. On applying the rule, however, it

will be found that every principle in relation to modified and excessive climates is happily confirmed. On approaching the southern coast, climate undergoes a striking modification. The seasons glide imperceptibly into each other, exhibiting no great extremes; thus, at Fort Snelling the difference between the mean temperature of the warmest and coldest month is 61° 18′, whilst at Cantonment Brooke, it is no more than 17° 68′. The Peninsula of Florida, however, is wholly peculiar in this respect; the course of vegetable life is unceasing: wild flowers spring up and flourish in the month of January; and so little is the temperature of the lakes and rivers diminished during the winter months, that one may almost at any time bathe in their waters.

The most prominent features of climate exhibited throughout the United States have thus been referred to in a general way. As these systems of climate consist of numerous subdivisions, which can be determined only by observation, a *comparative* view of them remains a desideratum; but the hope may be indulged, from present indications, that materials will in a few years be furnished for the composition of a complete meteorological chart, in which they may be systematically arranged.

The following tabular statement shows the mean annual temperature of various places, and the number of years upon which the results are based, with their locality, latitude, longitude, and height above the level of the sea. The table extends over a period of eleven years, but it does not perhaps embrace a moiety of the results that may be obtained from the observations of the same period. The elevation of some interior posts above tide-water, could not be ascertained, whilst the heights of those given are merely approximations:—

[T]

No.	PLACES OF OBSERVATION.	POSITION.			No. of years of observ.	Mean annual temp.
		Lat.	Long.	No. of ft. ab'e the level of ocean.		
1	Fort Brady (*outlet of L. Superior*)	46°39′	84°43′	595	6	41°89′
(2)	Hancock Barracks (*Me.*)	46 10	67 50		2	41 21
2	Fort Mackinac (*Isle of Mackinaw*)	45 51	85 05	728	2	40 56
3	,, Snelling (*near the junction of St. Peter's and Mississippi*)	44 53	93 08	780	10	45 34
4	,, Sullivan (*Eastport, Me.*)	44 44	67 04		5	42 97
5	Plattsburgh (*L. Champlain*)	44 41	73 26		1	47 01
6	Fort Howard (*Green Bay*)	44 40	87 00	600	9	44 93
7	Madison Barracks, Sackett's Harbour (*L. Ontario*)	43 57	76 04	250	1	48 60
8	Fort Preble (*Portland, Me.*)	43 38	70 18		5	46 34
9	,, Niagara (*Youngstown, N. Y.*)	43 15	79 05	250	2	51 69
10	,, Constitution (*Portsmouth, N.H.*)	43 04	70 49		4	47 21
11	,, Crawford (*Prairie du Chien, Wiscon.*)	43 03	90 53	580	4	45 65
12	,, Independence (*Boston*)	42 22	71 02		1	46 24
13	,, Wolcott (*Newport, R. I.*)	41 30	71 18		10	50 55
14	,, Armstrong (*Rock Island, Ill.*)	41 28	90 33		4	51 63
15	Council Bluffs (*near the junction of Platte and Missouri*)	41 45	96 00	800	6	50 50
16	West Point (*N. Y.*)	41 22	73 57		4	52 47
17	Fort Trumbull (*N. London, Con.*)	41 22	72 05		2	55 00
18	,, Columbus (*N. Y. Harbour*)	40 42	74 02		9	53 00
19	Alleghany Arsenal (*Pittsburgh*)	40 26	80 02	704	1	53 69
20	Fort Mifflin (*near Philadelphia*)	39 51	75 12		2	55 28
21	,, Delaware (*near New Castle*)	39 35	75 29		1	56 71
22	,, Severn (*Annapolis, Md.*)	38 58	76 27		2	56 40
23	Washington (*D. C.*)	38 53	76 55		8	56 57
24	Fort Washington (*Md.*)	38 41	76 58		1	58 02
25	Jefferson Barracks (*Mo.*)	38 28	90 08		4	58 14
26	F's Monroe (*Old Point Comfort, Va.*)	37 02	76 12		5	61 43
27	Fort Norfolk (*Va.*)	36 51	76 11		1	63 28
28	,, Gibson (*Arkansas.*)	35 47	95 10		3	62 90
29	,, Johnston (*Coast of N. C.*)	34 00	78 05		7	66 89
30	Augusta Arsenal (*Ga.*)	33 28	81 53		5	66 01
31	Fort Moultrie (*Charleston Harbour*)	32 42	79 56		3	64 49
32	,, Jesup (*near Sabine River, La.*)	31 30	93 47		8	67 94
33	Cantonment Montpelier (*Ala.*)	31 11	87 57		1	67 47
34	Fort Scott (*Ga.*)	30 49	84 47		1	68 54
35	Fernandina (*Amelia Island*)	30 40	81 37		2	70 06
36	Baton Rouge (*La.*)	30 26	91 18		1	68 07
37	Canton. Clinch (*near Pensacola*)	30 24	87 14		7	69 44
38	Petite Coquille (*near N. Orleans*)	30 10	89 38		4	71 25
39	Fort Gadsden (*Fl.*)	29 56	85 05		1	69 54
40	New Orleans (*La.*)	29 57	90 14		1	72 36
41	Fort Marion (*St Augustine, Fl.*)	29 50	81 27		4	72 49
42	,, St. Philip (*La.*)	29 29	89 71		1	70 45
43	Cant. Brooke (*Tampa Bay, Fl.*)	27 57	82 35*		5	72 80

* These degrees of latitude and longitude are in most cases merely approximations.

A reference to abstracts A, B, C, giving the ratios of the mean temperature of months and seasons, and to the tables comparative of positions on the Atlantic, the Lakes, and in the interior remote from such agencies, will illustrate pretty fully the diversities of our climate.

Although the extremes of annual temperature may occur at our most northern and southern posts, yet we do not there find the extremes of heat and cold. The tabular statement exhibiting the hottest and coldest day in each year, from 1820 to 1830, inclusive, given below, establishes this position. See table [U] p. 27. As the western posts, Snelling, Gibson, Council Bluffs, &c., remote from inland seas, are remarkable for extremes of winter and summer, so do they exhibit the hottest and coldest days and the greatest range of the thermometer. Forts Brady and Mackinac, the most northern stations, show, by a lesser range of the thermometer, the equalizing influence of the Lakes; whilst the Atlantic posts illustrate the controlling power of the ocean. In elucidation of the same law, we find that the mean summer temperature is greater at Augusta, Ga., than at St. Augustine or Tampa Bay, Florida. A reference to the subjoined tabular review, and to Abstracts A, B, C, showing the numerical ratios of the mean temperature of each month and season, and the annual and monthly ranges of temperature, will exhibit in strong contrast the diversities in these *particular systems* of climate. In Africa, the mercury is sometimes seen at 125°, and in British India it is said to have been as high as 130°. In the table of the highest temperature observed in different climates, as given by M. Arago, it is noted at 130° in the Oasis of Mourzouk. In our own Diaries, it is marked at 116°, on the 15th August, 1834, at Fort Gibson.* As no register-thermometers have been used at our posts, the range throughout the 24 hours may be greater than that given in the Diaries. The interor posts remote from Lakes, are denoted in the subjoined table [U] by an asterisk; whilst those on lakes, or the sea-board and its vicinity, are without any sign.

This table confirms the position that extremes of temperature are found as we approach the interior of a continent, unless modified by inland seas. Even along our southern coast the extreme of heat is less than on our more northern sea-board. The United States, it has been seen, present numerous *systems of climate* in which the division of the annual heat among the different seasons exhibits remarkable diversity.

* According to Assistant Surgeon J. B. J. Wright.

PLACES OF OBSERVATION.	Lat.	Lowest degree.	Highest degree.
1820.			
*Fort Snelling	44°53′	–30	93
Portsmouth (*N. H.*)	43 04	–3	94
*Prairie du Chien (*Wi.*)	43 03	–23	99
Boston Harbour	42 22	–1	98
*Council Bluffs	41 25	–22	105
New London (*Con.*)	41 22	8	88
Fort Johnston (*N. C.*)	34 00	28	90
New Orleans	29 57	35	92
1821.			
*Fort Snelling	44 53	–32	92
Portland (*Me.*)	43 38	–18	94
Portsmouth (*N. H.*)	43 04	–12	90
*Prairie du Chien (*Wi.*)	43 03	–36	91
Boston Harbour	42 22	–10	99
*Fort Armstrong (*Ill.*)	41 28	–28	94
*Council Bluffs	41 25	–13	100
Fort Johnston (*N. C.*)	34 00	30	89
Fort St. Philip (*La.*)	29 29	32	92
1822.			
*Fort Snelling	44 53	–29	92
Portland (*Me.*)	43°38′	–10	96
Portsmouth (*N. H.*)	43 04	–7	86
*Prairie du Chien	43 03	–22	94
*Fort Armstrong (*Ill.*)	41 28	–15	94
Boston Harbour	42 22	–7	92
*Council Bluffs	41 25	–17	108
Fort Johnston (*N. C.*)	34 00	26	90
Cant. Clinch (*n'r Pens.*)	30 24	20	93
1823.			
Fort Brady	46 39	–30	90
*Fort Howard (*Wis.*)	44 40	–38	100
Eastport (*Me.*)	44 44	–10	90
Boston Harbour	42 22	–3	97
*Council Bluffs	41 25	–16	102
N. York Harbour	40 42	3	91
Charleston Harbour	32 42	19	89
Cant. Clinch (*n'r Pens.*)	30 24	11	94
1824.			
Fort Brady	46 39	–33	84
*Fort Snelling	44 53	–27	
Eastport (*Me.*)	44°44′	–19	86
*Prairie du Chien	43 03	–28	96
Boston Harbour	42 22	–8	90
*Council Bluffs	41 25	–21	103
N. York Harbour	40 42	2	96
Charleston Harbour	32 42	24	91
Cant. Clinch (*n'r Pens.*)	30 24	24	95
1825.			
Fort Brady	46 39	–21	89
Eastport (*Me.*)	44 44	–5	94
*Fort Howard	44 40	–25	100
Boston Harbour	42 22	–5	98
*Council Bluffs	41 25	–11	102
N. York Harbour	40 42	–3	104
Charleston Harbour	32 42	28	94
St. Augustine	29 50	42	94
1826.			
Fort Brady	46 39	–37	—
*Fort Mackinac	45 51	–31	82

REMARKS.

☞Eastport is north of Fort Howard.

☞Boston is north of Fort Howard.

Table [U] continued.

PLACES OF OBSERVATION.	Lat.	Lowest degree.	Highest degree.
*Fort Snelling	44°53′	–23	92
Eastport	44 44	–24	98
*Fort Howard	44 40	–30	100
Boston Harbour	42 22	–10	98
*Fort Armstrong	41 28	–18	90
*Council Bluffs	41 25	–16	104
N. York Harbour	40 42	1	97
Fort Johnston	34 00	28	86
Tampa Bay (*Fl.*)	27 57	28	92
1827.			
*Fort Snelling	44 53	–22	96
Eastport	44 44	–4	89
*Sackett's Harbour	43 57	–27	82
Boston Harbour	42 22	–7	94
*Fort Armstrong	41 28	–6	94
*Council Bluffs	41 25	–12	—
*West Point	41 22	–10	101
N. York Harbour	40 42	0	96
*Augusta (*Ga.*)	33 28	26	102
Charleston Harbour	32 42	16	89
Tampa Bay	27 57	26	94

PLACES OF OBSERVATION.	Lat.	Lowest degree.	Highest degree.
1828.			
Fort Brady	46°39′	–20	91
*Fort Snelling	44 53	–22	92
Eastport	44 44	–10	85
*Prairie du Chien	43 03	–11	97
Boston Harbour	42 22	3	94
N. York Harbour	40 42	9	90
*Jefferson Barracks	38 28	10	100
*Fort Gibson	35 30	19	101
Fort Johnston	34 00	42	86
Tampa Bay	27 57	50	94
1829.			
*Hancock Barracks	46 10	–24	92
*Fort Snelling	44 53	–30	90
Eastport	44 44	–16	82
*Fort Howard	44 40	–32	92
Boston Harbour	42 22	–4	88
*Fort Armstrong	41 28	–16	96
N. York Harbour	40 42	7	95
*Fort Leavenworth	39 25	–22	95

PLACES OF OBSERVATION.	Lat.	Lowest degree.	Highest degree.
*Jefferson Barracks	38°28′	1	97
*Fort Gibson	35 30	0	106
Fort Johnston	34 00	21	86
Charleston Harbour	32 42	22	100
Tampa Bay	27 57	28	92
1830.			
Fort Brady	46 39	–26	93
*Fort Snelling	44 53	–26	94
Eastport	44 44	–14	93
*Fort Howard	44 40	–26	100
*Prairie du Chien	43 03	–23	94
Boston Harbour	42 22	–4	93
*Fort Armstrong	41 28	–24	98
N. York Harbour	40 42	5	98
*Council Bluffs	41 25	—	105
Fort Severn (*Annapolis*)	38 58	10	100
*Jefferson Barracks	38 28	–5	98
*Fort Gibson	35 30	3	107
Charleston Harbour	32 42	20	94
Tampa Bay	27 57	30	92

☞Council Bluffs is north of New York.

METEOROLOGICAL REGISTER.

MONTHLY ABSTRACTS.

No. I. JANUARY.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'y.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Mackinac	16.96	21.19	18.64	18.93	40	–17	57	6	4	2	1	2	8	-	8	S.	8	8	4	11	Cl'dy.
Fort Snelling	10.19	15.12	13.96	13.09	42	–23	65	-	3	-	2	4	4	8	10	W.	18	5	2	6	Fair.
Fort Sullivan	20.80	26.54	22.16	23.17	44	–24	68	5	5	2	2	-	3	4	10	W.	14	13	1	3	Cl'dy.
Fort Howard	18.41	21.74	17.41	19.19	47	–20	67	-	5	-	-	-	-	21	5	S.W.	15	10	2	4	"
Fort Wolcott	29.32	34.74	35.41	33.16	50	2	48	1	11	2	-	4	-	10	3	N.W.	14	10	5	2	"
Council Bluffs	15.48	31.16	19.51	22.05	60	–16	76	16	1	2	1	-	8	2	1	N.	18	13	-	-	Fair.
Fort Columbus	25.77	32.58	28.32	28.89	48	–1	49	-	13	3	1	1	2	6	5	N.W.	16	5	7	3	"
Fort Delaware	32.25	39.93	33.28	35.15	62	8	54	-	14	10	-	1	-	6	-	N.W.	24	5	1	1	"
Washington city	31.00	41.00	35.00	35.66	60	0	60	-	8	7	-	3	3	6	4	N.W.	22	4	3	2	"
Fortress Monroe	40.90	46.29	43.48	43.55	62	21	41	1	8	4	4	2	-	9	3	S.W.	17	9	4	1	"
Fort Johnston	44.16	50.61	47.64	47.47	67	30	37	5	14	1	3	-	4	1	3	N.W.	19	6	6	-	"
Augusta Arsl.	46.12	50.58	49.03	48.57	64	28	36	-	5	-	8	1	1	8	8	S.W.	13	10	7	1	Cl'dy.
Canton. Jesup	44.03	47.39	49.03	46.82	78	14	64	8	3	-	2	5	4	3	6	N.	18	2	10	1	Fair.
Canton. Clinch	47.51	55.93	50.92	51.45	68	24	44	-	10	1	2	6	5	7	-	N.W.	19	2	8	2	"
New Orleans	45.25	60.87	53.48	53.20	77	25	52	6	2	6	4	9	-	3	1	E.	19	5	7	-	"
St. Augustine	54.74	59.10	56.22	56.48	67	44	23	-	2	18	-	3	-	2	6	N.E.	17	11	3	-	"
Canton. Brooke	53.09	64.64	54.19	57.31	80	40	40	-	9	-	5	2	1	7	7	N.W.	25	3	3	-	"

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.																		
	VII.	II.	IX.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Fort Mackinac	13.67	21.92	17.39	17.66	38	–8	46	4	5	-	1	2	4	1	11	W.	14	6	1	7	Cl'dy.
Fort Snelling	8.92	26.07	13.46	16.15	50	–20	70	-	5	-	-	1	7	12	3	S.W.	16	4	1	7	Fair.
Fort Sullivan	18.46	27.50	22.21	22.72	48	–20	68	-	5	5	1	1	2	6	8	W.	12	11	2	3	Cl'dy.
Fort Howard	14.96	26.42	15.17	18.85	46	–32	78	2	4	1	-	-	2	16	3	S.W.	17	7	-	4	Fair.
Fort Wolcott	31.39	36.00	33.50	33.63	53	7	46	-	9	4	1	4	-	9	1	N.W.	12	3	10	3	Cl'dy.
Council Bluffs	14.46	35.21	21.25	23.64	58	–10	68	12	1	-	2	2	8	2	1	N.	21	3	-	4	Fair.
Fort Columbus	27.17	35.25	31.51	31.31	55	1	54	3	6	4	1	-	3	5	6	N.W.	14	5	5	4	Equal.
Fort Delaware	31.71	43.92	35.65	37.09	56	20	36	-	9	6	-	2	-	11	-	S.W.	10	11	7	-	„
Washington city	36.00	47.00	41.00	41.33	68	11	57	2	4	6	-	3	1	12	-	S.W.	18	6	4	-	Fair.
Fortress Monroe	45.14	51.75	47.82	48.23	63	32	31	1	3	3	5	8	1	7	-	S.E.	14	4	10	-	Equal.
Fort Johnston	52.92	58.98	57.25	56.38	70	42	28	7	5	1	2	1	5	-	7	N.	10	11	7	-	„
Augusta	51.64	59.64	57.35	56.21	76	37	39	2	2	2	6	4	-	5	7	W.	17	5	6	-	Fair.
Canton. Jesup	47.39	66.21	59.67	57.76	79	28	51	7	1	6	4	5	2	2	1	N.	18	-	10	-	„
Canton. Clinch	54.60	62.75	58.78	58.71	72	38	34	-	6	2	2	12	3	3	-	S.E.	10	5	13	-	Cl'dy.
New Orleans	58.25	68.78	62.67	63.27	84	42	42	1	3	8	5	2	2	2	5	S.E.	13	15	-	-	„
St. Augustine	63.21	67.14	64.60	64.98	77	52	25	4	1	9	1	5	3	-	5	N.E.	18	5	5	-	Fair.
Canton, Brooke	62.28	77.50	68.85	69.54	88	58	30	-	5	1	8	6	2	3	3	E.	25	-	3	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Mackinac	23.22	29.93	25.83	26.32	41	−8	49	7	2	10	7	1	2	1	1	N.E.	12	11	1	7	Cl'dy.
Fort Snelling	21.32	39.19	28.29	29.60	56	−4	60	1	3	-	2	8	4	2	11	W.	16	5	2	8	Fair.
Fort Sullivan	27.35	36.83	29.32	31.17	49	9	40	1	8	2	6	2	3	3	6	N.W.	12	15	2	2	Cl'dy.
Fort Howard	22.09	38.93	27.16	29.39	56	0	56	-	-	23	-	-	-	6	2	N.E.	14	10	2	5	„
Fort Wolcott	34.58	44.29	38.06	38.98	60	17	43	3	10	6	1	6	-	5	-	N.W.	11	9	11	-	„
Council Bluffs	28.77	41.80	33.55	34.71	70	6	64	12	2	5	1	4	6	-	1	N.	15	10	3	3	„
Fort Columbus	33.32	42.77	36.93	37.67	67	17	50	-	12	1	7	-	6	3	2	N.W.	14	4	12	1	„
Fort Delaware	35.41	47.09	36.00	39.50	54	30	24	-	3	5	-	11	-	12	-	S.W.	11	9	10	1	„
Washington city	43.00	55.00	49.00	49.00	78	36	42	1	11	14	-	2	3	-	-	N.E.	20	5	6	-	Fair.
Fortress Monroe	52.16	58.38	54.09	54.87	73	39	34	7	-	6	3	6	1	6	2	N.	14	9	8	-	Cl'dy.
Fort Johnston	60.12	65.87	63.25	63.08	78	42	36	11	4	-	-	1	8	3	4	N.	20	5	6	-	Fair.
Augusta Arsl.	61.77	69.61	66.25	65.87	80	44	36	2	1	2	4	1	5	13	3	S.W.	25	3	3	-	„
Canton. Jesup	63.16	75.70	66.61	68.49	88	40	48	3	7	7	4	9	-	1	-	S.E.	19	12	-	-	„
Canton. Clinch	62.93	72.00	67.25	67.46	76	48	28	2	8	-	-	7	10	4	-	S.	21	-	10	-	„
New Orleans	67.29	76.58	68.25	70.71	82	52	30	5	1	1	8	8	6	2	-	E.	19	7	5	-	„
St. Augustine	68.61	73.19	70.09	70.63	78	59	19	-	2	12	-	9	-	3	5	N.E.	25	4	2	-	„
Canton. Brooke	68.20	81.03	69.48	72.90	88	54	34	-	4	7	2	5	1	8	4	S.W.	28	-	3	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Mackinac	29.80	36.23	32.53	32.85	46	10	36	4	3	3	6	-	4	2	8	W.	11	7	8	4	Cl'dy.
Fort Snelling	31.90	45.93	35.20	37.68	60	4	56	-	1	-	5	4	1	9	10	W.	14	9	4	3	„
Fort Sullivan	35.14	47.80	35.90	39.61	60	16	44	3	8	-	2	-	9	3	5	S.	16	13	1	-	Fair.
Fort Howard	30.10	52.03	36.40	39.51	68	4	64	-	-	7	1	-	-	21	1	S.W.	14	11	4	1	Cl'dy.
Fort Wolcott	39.50	49.20	42.60	44.03	64	21	43	-	12	5	-	5	-	8	-	N.W.	13	7	6	4	„
Council Bluffs	40.86	57.00	46.00	47.95	88	13	75	9	6	-	-	3	11	-	1	S.	11	14	4	1	„
Fort Columbus	38.26	49.23	42.33	43.27	63	20	43	2	7	3	3	5	5	5	-	N.W.	13	11	4	2	„
Fort Delaware	42.13	55.86	39.33	45.77	70	26	44	1	9	1	-	5	-	14	-	S.W.	21	7	1	1	Fair.
Washington city	47.66	59.83	52.60	53.36	81	31	50	4	7	8	-	3	4	3	1	N.	17	5	7	1	„
Fortress Monroe	54.23	59.66	56.00	56.63	76	34	42	2	2	2	7	7	4	3	3	E.	18	6	6	-	„
Fort Johnston	63.46	68.86	66.55	66.29	79	46	33	8	3	1	-	-	13	2	3	S.	22	5	3	-	„
Augusta Arsl.	64.00	71.60	68.69	68.09	84	51	33	-	1	1	4	3	4	9	8	S.W.	21	4	5	-	„
Canton. Jesup	65.46	76.90	68.33	70.23	88	40	48	5	4	8	3	9	1	-	-	S.E.	17	6	7	-	„
Canton. Clinch	67.33	74.73	70.10	70.72	82	44	38	-	5	-	-	6	2	17	-	S.W.	23	-	7	-	„
New Orleans	70.16	78.23	69.23	72.54	88	52	36	3	2	5	9	3	2	3	3	E.	16	12	2	-	„
St. Augustine	72.93	76.40	73.23	74.19	84	60	24	1	-	10	3	3	1	9	2	N.E.	24	4	2	-	„
Canton. Brooke	67.80	83.06	73.46	74.77	86	62	24	-	3	4	6	5	1	1	10	W.	26	3	1	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Mackinac	48.12	53.45	50.22	50.59	70	32	38	2	1	-	13	-	4	2	9	E.	15	4	12	-	Cl'dy.
Fort Snelling	63.51	74.38	62.38	66.76	89	36	53	-	1	-	1	7	11	7	4	S.	21	-	10	-	Fair.
Fort Sullivan	48.77	66.22	46.90	53.96	90	38	52	2	4	-	6	1	11	5	2	S.	22	6	3	-	"
Fort Howard	52.06	76.61	58.38	62.35	94	36	58	-	-	15	-	-	-	16	-	S.W.	16	10	5	-	"
Fort Wolcott	54.54	66.03	58.16	59.58	76	44	32	-	4	3	-	5	-	18	1	S.W.	16	13	2	-	"
Council Bluffs	62.97	83.45	68.74	71.72	98	44	54	2	1	1	1	2	23	1	-	S.	20	10	1	-	"
Fort Columbus	59.12	74.96	60.58	64.88	91	44	47	1	1	-	2	3	19	5	-	S.	26	5	-	-	"
Fort Delaware	65.13	78.45	64.82	69.46	89	54	35	-	3	-	-	5	1	21	1	S.W.	26	2	3	-	"
Washington city	64.16	81.64	74.48	73.42	93	56	37	1	6	6	1	5	3	7	2	S.W.	22	5	4	-	"
Fortress Monroe	68.80	74.83	71.09	71.57	84	58	26	1	-	3	2	9	4	7	5	S.E.	19	9	3	-	"
Fort Johnston	72.19	78.29	72.54	74.34	82	64	18	8	1	1	-	-	8	5	8	S.	27	3	1	-	"
Augusta Arsl.	71.29	81.93	79.16	77.46	90	61	29	2	3	3	1	5	3	14	-	S.W.	26	-	5	-	"
Canton. Jesup	75.41	83.67	74.64	77.91	91	56	35	-	2	2	4	6	12	5	-	S.	19	2	10	-	"
Canton. Clinch	73.80	83.06	77.38	78.08	92	66	26	-	3	4	-	5	9	10	-	S.W.	24	1	6	-	"
New Orleans	71.12	85.45	76.25	77.61	92	62	30	6	1	4	4	4	8	3	1	S.	27	4	-	-	"
St. Augustine	77.19	80.41	77.19	78.26	84	75	9	2	4	11	1	9	-	4	-	N.E.	27	2	2	-	"
Canton. Brooke	75.67	87.35	76.19	79.74	90	62	28	-	1	3	11	7	3	2	4	E.	23	-	8	-	"

No. VI.

JUNE.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Mackinac	57.46	66.30	59.76	61.14	84	48	36	3	2	-	10	-	4	-	11	W.	11	7	12	-	Rain.
Fort Snelling	71.13	78.53	66.50	72.05	92	56	36	1	3	-	2	3	5	5	11	W.	14	6	10	-	Cl'dy.
Fort Sullivan	54.93	72.13	53.16	60.07	85	45	40	1	4	2	2	1	11	9	-	S.	23	6	1	-	Fair.
Fort Howard	58.63	82.10	62.93	67.89	98	44	54	1	-	14	-	-	-	14	1	S.W.	14	11	5	-	Cl'dy.
Fort Wolcott	61.43	68.66	62.63	64.24	82	51	31	-	1	5	1	4	-	19	-	S.W.	13	5	12	-	"
Council Bluffs	69.06	88.13	71.90	76.40	99	58	41	4	5	5	1	3	10	2	-	S.	23	5	2	-	Fair.
Fort Columbus	66.66	76.56	66.00	69.77	95	51	44	-	3	3	4	7	3	8	2	S.W.	17	8	5	-	"
Fort Delaware	70.23	86.56	72.90	76.56	94	66	28	-	1	5	2	7	4	8	3	S.W.	15	7	8	-	Equal.
Washington city	69.23	85.66	74.66	76.51	95	64	31	2	3	8	-	3	2	11	1	S.W.	14	10	6	-	Cl'dy.
Fortress Monroe	75.86	81.00	77.20	78.02	90	69	21	-	2	2	4	13	2	6	1	S.E.	17	7	6	-	Fair.
Fort Johnston	79.03	83.73	81.10	81.28	86	71	15	7	5	-	-	-	16	1	1	S.	27	2	1	-	"
Augusta Arsl.	76.66	87.43	73.70	79.26	94	70	24	-	8	2	-	2	3	14	1	S.W.	17	1	12	-	"
Canton. Jesup	76.66	85.66	77.13	79.82	90	71	19	-	2	6	8	4	4	6	-	E.	18	2	10	-	"
Canton. Clinch	77.83	82.26	79.80	79.96	90	74	16	2	4	3	-	1	1	18	1	S.W.	11	-	19	-	Rain,
New Orleans	82.40	87.40	79.93	83.24	93	75	18	5	3	2	3	4	5	4	4	S.	21	7	2	-	Fair.
St. Augustine	81.40	84.16	81.26	82.27	92	80	12	-	4	17	-	6	2	1	-	N.E.	20	3	7	-	"
Canton. Brooke	77.80	88.53	71.00	79.11	90	74	16	-	3	-	8	3	8	7	1	E.	10	2	17	1	Rain.

PLACES OF OBSERVATION.	THERMOMETER. Mean Temperature. A.M. VII.	P.M. II.	P.M. IX.	Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	WINDS. N. Days.	N.W. Days.	N.E. Days.	E. Days.	S.E. Days.	S. Days.	S.W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cl'dy. Days.	Rain. Days.	Snow. Days.	Prevailing.
Fort Mackinac	63.54	71.87	64.90	66.74	82	54	28	4	6	2	-	1	6	3	9	W.	20	3	8	-	Fair.
Fort Snelling	72.35	80.71	68.48	73.85	90	57	33	1	2	-	-	1	6	12	9	S.W.	21	3	7	-	,,
Fort Sullivan	59.67	80.80	60.83	66.90	98	52	46	3	2	-	-	-	23	-	3	S.	22	9	-	-	,,
Fort Howard	61.12	84.90	66.19	70.74	100	48	52	-	-	12	1	-	-	18	-	S.W.	25	4	2	-	,,
Fort Wolcott	68.90	77.16	70.93	72.33	85	61	24	2	2	6	-	3	-	18	-	S.W.	19	6	6	-	,,
Council Bluffs	70.25	87.93	72.67	76.95	104	60	44	3	6	-	-	4	15	1	2	S.	19	10	2	-	,,
Fort Columbus	71.96	84.96	70.90	75.94	97	62	35	2	8	3	-	1	-	14	3	S.W.	27	-	4	-	,,
Fort Delaware	75.29	80.64	77.25	77.72	89	70	19	-	4	5	-	6	6	8	2	S.W.	16	6	9	-	,,
Washington city	69.45	87.35	75.64	77.48	95	58	37	4	10	4	-	5	2	6	-	N.W.	17	10	4	-	,,
Fortress Monroe	77.74	82.90	79.32	79.98	91	71	20	-	2	2	4	11	1	10	1	S.E.	23	2	6	-	,,
Fort Johnston	79.58	83.87	81.38	81.61	88	74	14	-	2	2	4	11	1	10	1	S.E.	23	2	6	-	,,
Augusta Arsl.	77.70	87.93	84.29	83.30	94	71	23	-	1	3	4	6	6	11	-	S.W.	11	10	10	-	Cl'dy.
Canton. Jesup.	80.80	89.74	85.80	85.45	97	69	28	1	2	5	3	7	6	5	2	S.E.	24	3	4	-	Fair.
Canton. Clinch	80.06	87.09	81.48	82.88	93	76	17	1	3	5	1	4	3	12	2	S.W.	17	2	12	-	,,
New Orleans	83.87	89.67	81.87	85.14	96	78	18	6	2	3	8	2	6	-	4	E.	14	17	-	-	Cl'dy.
St. Augustine	83.06	86.48	82.96	84.16	92	78	14	-	4	17	-	5	1	4	-	N.E.	20	7	4	-	Fair.
Canton. Brooke	78.45	87.74	78.45	81.55	92	72	20	-	1	2	-	4	6	9	9	S.W.	19	1	11	-	,,

AUGUST.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M	P.M.	P.M.																		
	VII.	II.	IX.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Fort Mackinac	60.74	68.48	60.64	63.29	82	50	32	3	3	3	3	5	5	3	6	W.	18	2	11	-	Fair.
Fort Snelling	69.51	76.54	64.67	70.24	87	54	33	-	6	-	-	5	3	8	9	W.	17	7	7	-	„
Fort Sullivan	62.87	77.67	62.06	67.53	87	50	37	3	-	8	4	1	10	3	2	S.	8	21	2	-	Cl'dy.
Fort Howard	60.00	80.35	64.38	68.24	92	52	40	-	3	5	2	1	1	14	5	S.W.	25	4	2	-	Fair.
Fort Wolcott	68.22	74.77	70.80	71.26	79	57	22	2	1	12	-	5	1	10	-	N.E.	7	7	17	-	Rain.
Council Bluffs	68.06	85.64	70.54	74.75	98	58	40	7	4	2	1	-	15	2	-	S.	18	13	-	-	Fair.
Fort Columbus	71.67	82.87	73.16	75.90	94	66	28	-	4	10	2	9	-	6	-	N.E.	24	2	5	-	„
Fort Delaware	74.06	78.03	76.00	76.03	87	70	17	3	3	2	3	5	4	11	-	S.W.	19	2	10	-	„
Washington city	68.25	86.16	74.35	76.25	96	62	34	2	5	11	2	2	2	6	1	N.E.	11	17	3	-	Cl'dy.
Fortress Monroe	76.97	82.32	78.70	79.33	92	70	22	2	1	6	2	7	1	8	4	S.W.	19	4	8	-	Fair.
Fort Johnston	79.16	82.48	80.64	80.76	86	74	12	11	4	1	-	-	3	10	2	N.	18	9	4	-	„
Augusta Arsl.	77.25	85.35	81.06	81.22	93	75	18	2	-	6	5	7	5	6	-	S.E.	10	9	12	-	Rain.
Canton. Jesup	78.25	89.74	83.96	83.98	100	60	40	9	6	7	1	2	2	3	1	N.	23	6	2	-	Fair.
Canton. Clinch	78.19	86.32	81.19	81.90	92	73	19	-	7	6	-	4	3	11	-	S.W.	17	-	14	-	„
New Orleans	85.38	88.90	81.16	85.15	94	76	18	10	1	2	1	-	-	1	16	W.	13	18	-	-	Cl'dy.
St. Augustine	81.61	84.19	82.06	82.62	90	76	14	-	3	15	-	-	-	9	4	N.E.	16	9	6	-	Fair.
Canton. Brooke	77.74	84.51	77.93	80.06	90	72	18	-	5	1	-	-	4	9	12	W.	17	1	13	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Mackinac	53.30	58.16	53.06	54.84	70	40	30	4	1	5	-	3	11	1	5	S.	12	5	13	-	Cl'dy.
Fort Snelling	49.96	63.20	52.80	55.32	78	40	38	1	2	-	1	4	1	10	11	W.	12	4	14	-	Rain.
Fort Sullivan	55.36	68.93	54.80	59.70	82	44	38	5	1	2	-	-	6	12	4	S.W.	21	7	2	-	Fair.
Fort Howard	51.20	64.13	56.46	57.26	80	44	36	1	5	-	9	1	3	3	8	E.	14	12	4	-	Cl'dy.
Fort Wolcott	63.26	69.33	64.86	65.82	77	50	27	1	3	7	-	3	1	15	-	S.W.	9	13	8	-	"
Council Bluffs	54.23	74.16	59.86	62.75	94	40	54	5	7	2	-	4	10	2	-	S.	16	11	3	-	Fair.
Fort Columbus	64.63	74.96	66.96	68.85	87	51	36	-	9	3	3	5	1	5	4	N.W.	17	1	12	-	"
Fort Delaware	74.46	78.50	76.83	76.59	82	70	12	-	2	2	1	5	5	13	2	S.W.	17	5	8	-	"
Washington city	65·23	80.43	71.36	72.34	92	58	34	1	6	11	-	1	5	4	2	N.E.	9	13	8	-	Cl'dy.
Fortress Monroe	73.90	78.80	76.83	76.51	90	62	28	4	-	8	4	5	3	5	1	N.E.	15	4	11	-	Equal.
Fort Johnston	77.26	81.20	79.73	79.39	88	64	24	7	4	2	5	2	7	-	3	-	15	5	10	-	"
Augusta Arsl.	73.50	81.86	78.73	78.03	90	55	35	1	3	5	4	5	4	3	5	-	9	13	8	-	Cl'dy.
Canton. Jesup	70.93	81.66	75.63	76.07	94	47	47	3	2	8	9	6	1	1	-	E.	14	5	11	-	"
Canton. Clinch	74.06	83.26	78.40	78.57	89	54	35	-	6	3	-	3	-	18	-	S.W.	24	-	6	-	Fair.
New Orleans	77.50	82.96	81.46	80.64	90	64	26	11	-	1	11	-	1	4	2	E.	14	16	-	-	Cl'dy.
St. Augustine	80.56	84.13	81.23	81.97	89	73	16	1	3	21	-	-	-	5	-	N.E.	23	3	4	-	Fair.
Canton. Brooke	78.06	88.46	78.20	81.57	92	72	20	-	1	2	8	2	6	-	11	W.	24	-	6	-	"

OCTOBER.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Mackinac	45.93	53.22	46.74	48.63	69	29	40	2	1	2	3	4	8	6	5	S.	11	13	6	1	Cl'dy.
Fort Snelling	41.93	57.87	47.58	49.13	82	26	56	-	1	-	2	1	2	14	11	S.W.	24	3	4	-	Fair.
Fort Sullivan	45.09	55.48	45.61	48.71	69	28	41	-	8	4	1	3	5	7	3	N.W.	18	11	2	-	„
Fort Howard	43.96	58.58	50.22	50.92	80	26	54	2	5	-	6	3	4	5	6	W.	16	14	1	-	„
Fort Wolcott	52.32	60.41	54.67	55.66	70	32	38	2	8	8	-	3	-	9	1	S.W.	15	7	9	-	Cl'dy.
Council Bluffs	46.12	72.19	53.93	57.41	96	27	69	12	4	-	1	4	10	-	-	N.	18	12	1	-	Fair.
Fort Columbus	52.25	62.41	54.93	56.53	77	35	42	4	8	4	4	4	1	3	3	N.W.	18	3	10	-	„
Fort Delaware	57.29	64.06	51.70	57.68	76	47	29	1	7	1	2	10	2	5	3	S.E.	16	6	9	-	„
Washington city	50.54	67.77	57.74	58.68	83	31	52	-	14	5	-	1	2	6	3	N.W.	20	4	7	-	„
Fortress Monroe	59.58	68.32	61.45	63.11	82	40	42	4	9	3	1	4	1	3	6	N.W.	16	9	6	-	„
Fort Johnston	67.93	73.64	71.87	71.14	80	54	26	12	2	3	2	1	10	-	1	N.	19	9	3	-	„
Augusta Arsl.	63.09	73.06	68.58	68.24	84	48	36	3	2	1	4	4	6	7	4	S.W.	18	9	4	-	„
Canton. Jesup	63.25	75.90	67.09	68.75	88	44	44	1	10	12	1	5	-	2	-	N.E.	21	1	9	-	„
Canton. Clinch	66.16	77.83	72.09	72.03	84	48	36	-	11	2	-	8	5	5	-	N.W.	25	1	5	-	„
New Orleans	69.70	75.67	73.54	72.97	80	61	19	9	2	3	6	3	2	-	6	N.	19	12	-	-	„
St. Augustine	73.38	77.90	75.22	75.50	81	61	20	-	2	15	-	10	1	3	-	N.E.	24	-	7	-	„
Canton. Brooke	71.54	83.87	73.41	76.27	88	60	28	-	-	7	11	3	3	6	1	E.	27	1	3	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Mackinac	33.76	38.00	35.03	35.60	62	20	42	2	6	1	5	1	4	6	5	S.W.	5	15	3	7	Cl'dy.
Fort Snelling	29.83	42.10	33.83	35.29	60	17	43	-	5	-	1	1	2	8	13	W.	14	8	3	5	"
Fort Sullivan	34.93	41.96	37.83	38.24	57	16	41	1	9	1	-	3	6	6	4	N.W.	19	6	4	1	Fair.
Fort Howard	31.43	41.60	35.83	36.29	54	16	38	3	3	1	3	1	2	5	12	W.	12	17	-	1	Cl'dy.
Fort Wolcott	40.53	46.70	43.26	43.43	60	22	38	4	7	2	-	1	-	14	2	S.W.	13	9	5	3	"
Council Bluffs	33.40	54.60	39.76	42.59	76	20	56	15	6	-	-	2	6	-	1	N.	19	11	-	-	Fair.
Fort Columbus	39.80	48.53	42.66	43.66	62	26	36	1	14	3	-	3	5	1	3	N.W.	16	6	7	1	"
Fort Delaware	44.10	51.56	56.26	50.64	65	33	32	-	11	1	-	4	-	8	6	N.W.	19	1	10	-	"
Washington city	38.93	53.43	45.16	45.84	68	31	37	-	9	3	-	1	2	15	-	S.W.	14	10	6	-	Cl'dy.
Fortress Monroe	46.10	53.90	50.70	50.23	66	32	34	2	8	1	2	8	3	2	4	S.E.	17	9	4	-	Fair.
Fort Johnston	56.86	63.90	62.20	60.98	76	40	36	8	-	4	2	-	11	1	4	S.	28	-	2	-	"
Augusta Arsl.	51.50	60.46	56.80	56.25	77	36	41	-	5	1	2	3	12	7	-	S.W.	17	10	3	-	"
Canton. Jesup	53.06	68.86	58.93	60.28	82	30	52	2	8	4	1	4	6	4	1	N.W.	28	1	1	-	"
Canton. Clinch	55.23	69.13	63.83	62.73	80	34	46	-	15	1	-	4	-	10	-	N.W.	27	1	2	-	"
New Orleans	61.30	70.16	65.20	65.55	83	48	35	12	4	5	3	3	2	-	1	N.	17	13	-	-	"
St. Augustine	60.03	63.86	61.46	61.78	81	33	48	6	12	2	-	9	-	1	-	N.W.	25	3	2	-	"
Canton. Brooke	61.20	74.53	64.53	66.75	86	38	48	-	3	2	3	2	3	14	3	S.W.	29	-	1	-	"

No. XII. DECEMBER.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M. VII.	P.M. II.	P.M. IX.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Fort Mackinac	21.03	25.40	23.80	23.41	42	–16	58	6	3	3	6	4	3	5	1	E.	2	19	1	9	Cl'dy.
Fort Snelling	14.22	25.29	17.93	19.15	48	–19	67	-	1	-	1	3	2	5	19	W.	18	9	-	4	Fair.
Fort Sullivan	25.67	31.35	26.48	27.83	54	–3	57	4	13	1	-	2	5	5	1	N.W.	17	8	5	1	„
Fort Howard	17.28	24.90	20.58	20.92	46	–20	66	1	11	-	1	2	-	8	8	N.W.	15	14	-	2	Cl'dy.
Fort Wolcott	31.87	37.77	34.22	34.62	59	12	47	2	9	5	-	3	-	10	2	S.W.	15	6	5	5	„
Council Bluffs	22.45	41.61	28.41	30.82	63	–6	69	15	6	-	1	1	6	-	2	N.	19	11	1	-	Fair.
Fort Columbus	30.19	36.74	32.51	33.14	55	3	52	2	9	4	-	1	2	7	6	N.W.	17	5	4	5	„
Fort Delaware	35.09	42.19	37.77	38.35	65	14	51	-	16	1	1	3	-	6	4	N.W.	18	6	1	6	„
Washington city	31.25	42.87	34.83	36.31	66	8	58	2	12	4	-	4	2	7	-	N.W.	14	13	1	3	Cl'dy.
Fortress Monroe	39.45	46.06	43.16	42.89	63	12	51	5	2	6	4	4	1	4	5	N.E.	24	2	4	1	Fair.
Fort Johnston	50.93	57.29	54.00	54.07	69	28	41	6	2	3	2	1	17	-	-	S.	24	5	2	-	„
Augusta Arsl.	43.35	52.03	47.54	47.65	64	26	38	2	5	3	4	2	2	3	10	W.	17	9	5	-	„
Canton. Jesup	45.64	61.32	51.54	52.83	77	20	57	1	9	6	3	8	1	2	1	N.W.	23	-	7	1	„
Canton. Clinch	49.00	60.45	54.06	54.50	73	23	50	-	13	2	-	8	5	2	1	N.W.	21	2	8	-	„
New Orleans	50.93	62.32	61.58	58.28	72	34	38	3	2	5	9	5	3	2	2	E.	20	11	-	-	„
St. Augustine	51.80	69.70	57.10	59.53	77	29	48	1	3	10	1	6	2	3	4	N.E.	23	5	3	-	„
Canton. Brooke	52.96	70.45	57.22	60.21	78	28	50	1	4	3	5	4	7	1	6	S.	24	-	7	-	„

PLACES OF OBSERVATION.	Latitude.	Longitude.	THERMOMETER. Mean Temperature. A.M. VII.	P.M. II.	P.M. IX.	Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	WINDS. N. Days.	N.W. Days.	N.E. Days.	E. Days.	S.E. Days.	S. Days.	S.W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cl'dy. Days.	Rain. Days.	Snow Days.	Prevailing.
Fort Mackinac	45.51	85.05	38.96	45.35	40.71	41.67	84	–17	101	3.91	3.08	2.58	4.58	1.91	5.25	2.50	6.58	W.	11.58	8.33	6.66	3.83	Cl'dy.
Fort Snelling	44.53	93.08	40.40	52.08	42.09	44.86	92	–23	115	0.33	2.75	-	1.42	3.50	4.00	8.33	10.08	W.	17.08	5.25	5.33	2.75	Fair.
Fort Sullivan	44.44	67.04	40.75	52.77	41.44	44.98	98	–24	122	2.33	5.58	2.25	2.00	1.16	7.83	5.25	4.00	S.	17.00	10.50	2.08	0.83	„
Fort Howard	44.40	87.00	38.44	54.35	42.60	45.13	100	–32	132	0.83	3.00	6.50	1.93	0.66	1.00	12.25	4.25	S.W.	16.41	10.33	2.25	1.42	„
Fort Wolcott	41.30	71.18	47.99	55.42	50.76	51.39	85	2	83	1.42	6.42	5.42	0.25	3.83	0.17	12.08	0.83	S.W.	13.08	8.00	8.00	1.42	Cl'dy.
Council Bluffs	41.25	95.43	43.84	62.74	48.84	51.80	104	–16	120	9.33	4.08	1.42	0.75	2.42	10.66	1.00	0.75	S.	18.08	10.25	1.42	0.66	Fair.
Fort Columbus	40.42	74.02	48.40	58.48	50.56	52.48	97	–1	98	1.25	7.83	3.42	2.25	3.25	3.92	5.66	2.83	N.W.	18.25	4.58	6.25	1.33	„
Fort Delaware	39.35	75.29	53.10	62.23	54.82	56.71	94	8	86	0.42	6.83	3.25	0.75	5.33	1.83	10.25	1.75	S.W.	17.66	5.42	6.42	0.75	„
Washing'n c'y	38.53	76.55	51.23	65.78	57.15	58.02	96	0	96	1.58	8.00	7.25	0.25	2.75	2.58	7.00	1.16	N.W.	17.33	8.50	5.00	0.50	„
Fort.'s Monroe	37.02	76.12	59.24	65.35	61.65	62.08	92	12	80	2.42	3.08	3.83	3.50	7.00	1.83	5.83	2.92	S.E.	17.75	6.16	6.33	0.16	„
Fort Johnston	34.00	78.05	65.30	70.73	68.18	68.07	88	28	60	7.50	3.83	1.58	1.66	1.42	8.58	2.75	3.08	S.	21.00	5.16	4.25	-	„
Augusta Arsl.	33.28	81.53	63.16	71.79	67.60	67.52	94	26	68	1.16	3.00	2.47	3.83	3.58	4.25	8.33	3.83	S.W.	16.75	6.92	6.67	0.33	„
Cant. Jesup	31.30	93.47	63.67	75.24	68.20	69.04	100	14	86	3.33	4.66	5.91	3.58	5.83	3.25	2.83	1.00	N.E.	20.16	3.33	6.75	0.16	„
Cant. Clinch	30.24	87.14	65.60	74.57	69.60	69.92	93	23	70	0.41	7.58	2.41	0.41	5.66	3.83	9.75	0.33	S.W.	19.91	1.16	9.16	0.16	„
New Orleans	29.57	90.14	68.60	77.25	71.22	72.36	96	25	71	6.41	1.91	3.75	5.91	3.58	3.08	2.00	3.75	N.	17.66	11.41	1.33	-	„
St. Augustine	29.50	81.27	72.43	76.09	73.23	73.91	92	33	59	1.27	3.36	13.36	0.45	5.36	0.73	3.72	2.00	N.E.	21.72	4.63	4.00	-	„
Cant. Brooke	27.57	82.35	68.73	80.97	70.24	73.31	92	28	64	0.08	3.25	2.66	5.58	3.59	3.75	5.58	5.91	W.	23.08	0.91	6.33	0.8	„

No. I. JANUARY.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	12.58	23.51	16.41	17.36	40	–20	60	3	3	9	5	4	-	2	5	N.E.	6	17	-	8	Cl'dy.
Fort Snelling	11.09	24.19	16.51	17.26	44	–22	66	1	6	-	-	2	2	13	7	S.W.	17	9	1	4	Fair.
Fort Howard	10.32	23.54	14.77	16.21	40	–14	54	1	3	3	-	-	7	6	11	W.	17	13	-	1	„
Fort Preble	14.58	25.19	19.19	19.65	40	–8	48	4	5	5	-	-	-	11	6	S.W.	22	3	-	6	„
Fort Constitution	17.22	26.54	20.16	21.31	40	–8	48	8	9	1	-	-	2	3	8	N.W.	15	12	-	4	Cl'dy.
Fort Wolcott	22.41	28.64	24.09	25.05	41	–2	43	4	11	8	-	-	-	7	1	N.W.	14	9	1	7	„
Fort Armstrong	16.67	27.06	21.51	21.75	46	–6	52	3	10	2	2	3	4	-	7	N.W.	24	5	1	1	Fair.
West Point	19.38	28.93	21.61	23.31	49	–10	59	7	10	3	1	5	1	1	3	N.W.	18	4	1	8	„
Fort Trumbull	24.32	29.00	28.12	27.15	62	0	62	1	10	7	1	1	-	4	7	N.W.	19	5	2	5	„
Fort Columbus	21.22	28.45	22.38	24.02	43	0	43	4	12	2	4	1	3	1	4	N.W.	15	8	4	4	Cl'dy.
Washington city	24.51	36.32	29.77	30.20	54	9	45	4	10	5	-	2	1	6	3	N.W.	20	8	3	-	Fair.
Jefferson Barracks	25.06	40.41	30.80	32.09	53	8	45	1	8	-	1	4	10	1	6	S.	20	8	1	2	„
Fortress Monroe	31.32	40.51	37.90	36.58	58	13	45	5	2	6	4	4	1	4	5	N.E.	24	4	3	-	„
Augusta Arsl.	40.96	47.51	45.25	44.57	71	26	45	8	5	5	-	1	5	4	3	N.	13	12	6	-	Cl'dy.
Canton. Jesup	45.38	57.48	50.29	51.05	78	24	54	1	9	4	3	7	2	5	-	N.W.	18	7	6	-	Fair.
Canton. Clinch	47.38	55.32	51.38	51.36	72	24	48	10	2	7	-	3	7	2	-	N.	14	13	4	-	Cl'dy.
Petite Coquille	45.74	57.22	49.48	50.81	80	23	57	-	3	10	6	5	1	3	3	N.E.	15	11	5	-	„
Canton, Brooke	51.67	63.09	55.83	56.86	78	26	52	1	7	5	-	1	8	3	6	S.	25	3	3	-	Fair.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	16.21	30.85	21.14	22.73	47	-16	63	-	6	7	1	4	-	6	4	N.E.	7	6	2	13	Snow.
Fort Snelling	18.42	23.46	23.71	24.86	46	-8	54	-	1	-	-	1	3	7	16	W.	20	2	2	4	Fair.
Fort Howard	19.21	34.00	22.10	25.10	44	-6	50	4	2	-	-	-	1	11	10	S.W.	19	7	-	2	"
Fort Preble	18.75	31.10	23.82	24.56	45	-7	52	4	5	-	-	2	4	2	11	W.	22	2	1	3	"
Fort Constitution	21.21	33.07	26.35	26.88	47	-4	51	1	8	-	2	1	4	4	8	N.W.	15	11	1	1	"
Fort Wolcott	28.00	34.57	30.28	31.28	48	-1	49	1	13	5	-	1	-	8	-	N.W.	13	7	3	5	Cl'dy.
Fort Armstrong	25.78	38.07	31.25	31.37	57	2	55	9	9	1	2	-	4	1	2	N.W.	18	6	2	2	Fair.
West Point	26.00	38.60	31.00	31.87	54	2	52	4	6	2	-	3	2	6	5	N.W.	16	5	4	3	"
Fort Trumbull	31.07	36.85	36.28	34.73	48	5	43	1	7	6	3	1	2	3	5	N.W.	14	7	4	3	"
Fort Columbus	28.57	35.39	31.89	31.95	48	7	41	2	10	5	1	2	2	5	1	N.W.	15	3	6	4	"
Washington city	37.55	49.57	40.78	42.63	69	34	35	1	5	8	-	3	3	5	3	N.E.	10	10	6	2	Cl'dy.
Jefferson Barracks	37.03	53.46	43.17	44.55	72	24	48	4	5	1	-	10	8	-	-	S.E.	16	5	6	1	Fair.
Fortress Monroe	41.60	49.35	46.57	45.84	59	22	37	1	1	10	2	1	3	9	1	N.E.	9	8	11	-	Rain.
Augusta Arsl.	58.17	64.07	61.53	61.26	80	47	33	1	2	3	-	2	-	12	8	S.W.	13	7	8	-	Cl'dy.
Canton. Jesup.	57.89	69.21	61.46	62.85	84	44	40	4	5	8	2	9	-	-	-	S.E.	13	7	8	-	"
Canton. Clinch	60.96	67.85	63.50	64.10	77	44	33	6	2	-	-	6	5	9	-	S.W.	11	13	4	-	"
Petite Coquille	60.10	72.53	62.60	65.08	86	42	44	-	1	3	6	3	9	3	3	S.	23	3	2	-	Fair.
Canton. Brooke	64.07	78.32	66.64	69.68	82	50	32	-	-	-	-	6	2	8	12	W.	27		1	-	"

No. III.

MARCH.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M. VII.	P.M. II.	P.M. IX.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Fort Brady	18.25	34.61	24.70	25.85	51	–5	56	1	9	6	-	7	2	2	4	N.W.	8	15	4	4	Cl'dy.
Fort Snelling	25.85	39.74	29.61	31.74	56	–7	63	1	3	1	-	1	5	8	12	W.	18	6	2	5	Fair.
Fort Howard	23.74	40.96	28.29	31.00	56	–16	72	-	3	-	7	-	1	8	12	W.	21	6	3	1	"
Fort Preble	28.77	40.74	32.25	33.92	63	2	61	-	7	3	1	1	10	4	5	S.	21	7	3	-	"
Fort Constitution	31.29	41.83	33.45	35.52	66	11	55	2	8	2	1	2	8	2	6	N.W.	21	9	1	-	"
Fort Wolcott	34.03	42.61	38.25	38.30	56	24	32	1	15	2	-	5	-	8	-	N.W.	17	6	6	2	"
Fort Armstrong	35.16	45.38	40.74	40.43	74	16	58	3	8	3	1	2	8	4	2	N.W.	20	8	3	-	"
West Point	34.87	48.48	38.38	40.58	74	15	59	8	12	1	-	5	1	2	2	N.W.	21	6	4	-	"
Fort Trumbull	39.19	44.58	43.29	42.35	60	26	34	4	7	3	1	3	4	4	5	N.W.	21	4	6	-	"
Fort Columbus	34.61	46.03	37.38	39.34	64	18	46	5	10	2	3	4	3	1	3	N.W.	19	7	4	1	"
Washington city	40.09	55.80	46.35	47.41	73	33	40	1	15	3	-	3	6	3	-	N.W.	15	11	5	-	Cl'dy.
Jefferson Barracks	43.54	59.74	49.67	50.98	81	29	52	8	3	-	5	6	1	3	5	N.	22	2	5	2	Fair.
Fortress Monroe	46.58	55.09	55.58	51.08	66	35	31	2	2	8	3	2	3	6	5	N.E.	15	10	6	-	Cl'dy.
Augusta Arsl.	53.29	66.12	58.48	59.30	79	42	37	1	2	4	5	3	4	4	8	S.W.	18	5	8	-	Fair.
Canton. Jesup	54.61	67.67	58.70	60.33	82	34	48	-	7	3	2	9	5	3	2	S.E.	15	7	9	-	Cl'dy.
Canton. Clinch	58.51	67.61	63.58	63.23	79	43	36	3	5	-	-	4	12	5	2	S.	24	2	5	-	Fair.
Petite Coquille	57.25	70.38	60.35	62.66	87	42	45	1	6	5	5	5	4	1	4	N.W.	20	7	4	-	"
Canton. Brooke	65.35	78.64	67.41	70.47	84	52	32	-	3	-	1	6	4	2	15	W.	26	2	3	-	"

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	34.80	47.93	35.46	39.39	63	23	40	-	6	1	2	8	-	7	6	S.E.	2	15	10	3	Cl'dy.
Fort Snelling	41.86	51.43	41.00	44.76	65	28	37	-	2	-	2	3	2	4	17	W.	13	5	10	2	„
Fort Howard	36.93	52.73	39.93	43.20	68	26	42	1	-	6	2	-	·	3	18	W.	16	13	1	-	Fair.
Fort Preble	42.26	54.40	43.56	46.74	77	29	48	6	4	1	2	6	4	3	4	S.E.	18	4	8	-	„
Fort Constitution	44.33	53.30	45.26	47.63	76	33	43	2	8	8	1	1	4	3	3	N.W.	14	12	4	-	Cl'dy.
Fort Wolcott	44.56	52.90	47.80	48.42	60	30	30	1	7	8	1	2	-	11	-	S.W.	10	9	11	-	Rain.
Fort Armstrong	46.76	57.46	49.33	51.18	70	28	42	4	3	2	4	1	5	4	7	W.	21	5	4	-	Fair.
West Point	47.73	62.96	53.30	54.66	78	32	46	2	10	1	-	7	4	6	-	N.W.	17	6	7	-	„
Fort Trumbull	49.53	55.13	54.80	53.15	65	40	25	1	2	3	3	7	3	5	6	S.E.	14	5	11	-	Cl'dy.
Fort Columbus	47.20	59.86	49.13	52.06	76	36	40	3	7	-	-	8	4	5	3	S.E.	19	3	8	-	Fair.
Washington city	51.56	70.26	58.10	59.97	83	38	45	-	11	2	-	4	3	6	1	N.W.	13	11	6	-	Cl'dy.
Jefferson Barracks	54.00	69.66	60.00	61.22	85	40	45	-	4	-	1	5	9	5	6	S.	17	2	11	-	Fair.
Fortress Monroe	56.86	67.36	61.33	61.85	80	44	36	-	4	2	3	9	4	6	2	S.E.	10	10	10	-	Cl'dy.
Augusta Arsl.	62.33	73.53	67.93	67.93	85	52	33	-	2	-	3	7	7	5	6	S.	12	9	9	-	„
Canton. Jesup	64.23	76.50	67.90	69.54	88	48	40	5	2	4	5	6	4	3	1	S.E.	16	8	6	-	Fair.
Canton. Clinch	69.53	75.63	71.23	72.13	85	54	31	-	6	-	-	8	3	13	-	S.W.	23	3	4	-	„
Petite Coquille	67.20	81.06	68.20	72.15	94	54	40	1	2	2	6	3	12	2	2	E.	20	10	-	-	„
Canton. Brooke	70.33	83.67	72.13	75.38	88	62	26	-	1	2	-	5	1	10	11	W.	29	-	1	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	47.54	58.54	43.67	49.92	82	32	50	-	7	7	1	6	3	4	3	N.W.	8	20	2	1	Cl'dy.
Fort Snelling	59.77	70.16	58.87	62.93	86	40	46	2	3	-	2	4	8	3	9	W.	22	2	7	-	Fair.
Fort Howard	47.54	67.77	51.51	55.61	87	32	55	1	1	15	-	1	2	5	6	N.E.	26	5	-	-	„
Fort Preble	50.42	62.16	50.19	54.26	68	34	34	3	-	4	1	10	7	3	3	S.E.	22	5	4	-	„
Fort Constitution	50.83	59.29	50.70	53.61	87	38	49	3	2	2	3	2	14	2	3	S.	21	6	4	-	„
Fort Wolcott	51.80	61.35	53.61	55.59	75	38	37	1	9	3	1	6	-	11	-	S.W.	17	4	10	-	„
Fort Armstrong	59.16	71.58	60.74	63.83	90	46	44	1	4	7	-	-	12	2	5	S.	26	2	3	-	„
West Point	56.06	71.45	58.32	61.94	86	38	48	3	8	3	-	10	4	2	1	S.E.	22	4	5	-	„
Fort Trumbull	55.19	61.51	60.29	59.00	75	42	33	2	4	3	1	7	4	8	2	S.W.	19	6	6	-	„
Fort Columbus	55.61	66.45	56.55	59.54	84	41	43	1	4	3	2	10	5	3	3	S.E.	20	5	6	-	„
Washington city	62.38	72.09	64.19	66.22	84	50	34	-	8	9	-	6	3	4	1	N.E.	21	6	4	-	„
Jefferson Barracks	60.64	73.35	62.58	65.52	84	42	42	4	4	3	1	-	5	2	12	W.	21	2	8	-	„
Fortress Monroe	58.48	68.29	63.64	63.47	78	48	30	-	3	8	5	10	2	2	1	E.	15	8	8	-	Cl'dy.
Augusta Arsl.	65.00	78.93	68.83	70.92	86	48	38	-	-	2	5	2	2	13	7	S.W.	12	10	9	-	„
Canton. Jesup	66.45	79.50	70.71	72.22	93	46	47	4	5	6	4	7	1	1	3	S.E.	17	3	11	-	Fair.
Canton. Clinch	67.96	77.09	72.80	72.62	86	52	34	1	5	-	1	2	6	14	2	S.W.	16	6	9	-	„
Petite Coquille	68.70	80.09	70.77	73.19	90	54	36	1	2	9	6	3	4	4	2	N.E.	20	10	1	-	„
Canton. Brooke	73.54	85.61	74.96	78.04	90	62	28	-	1	-	-	7	-	8	15	W.	24	2	5	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	56.80	70.30	51.93	59.68	84	35	49	-	7	10	1	9	-	2	1	N.E.	12	12	6	-	Cl'dy.
Fort Snelling	70.56	77.83	67.46	71.95	92	50	42	1	-	-	1	3	13	5	7	S.	14	5	11	-	"
Fort Howard	60.76	80.80	62.90	68.15	96	40	56	-	1	7	2	4	-	4	12	W.	25	5	-	-	Fair.
Fort Preble	59.50	70.86	58.36	62.91	81	48	33	1	1	6	1	6	8	5	2	S.	20	6	4	-	"
Fort Constitution	60.03	66.43	58.80	61.75	79	51	28	-	1	2	1	1	18	3	4	S.	19	7	4	-	"
Fort Wolcott	60.83	69.52	63.23	64.52	77	47	30	1	8	2	1	2	2	14	-	S.W.	18	4	8	-	"
Fort Armstrong	71.40	77.26	68.26	72.31	94	50	44	4	2	1	3	2	16	1	1	S.	22	4	4	-	"
West Point	63.70	78.90	65.20	69.27	88	50	38	5	3	1	-	5	7	6	3	S.	16	10	4	-	"
Fort Trumbull	63.56	70.30	67.90	67.25	76	54	22	2	4	3	-	3	6	9	3	S.W.	20	4	6	-	"
Fort Columbus	64.00	76.46	65.33	68.60	89	50	39	-	7	2	-	8	7	2	4	S.E.	16	4	10	-	"
Washington city	71.16	80.46	71.43	74.35	92	58	34	5	6	7	2	2	-	8	-	S.W.	16	8	6	-	"
Jefferson Barracks	70.10	81.63	69.13	73.62	91	57	34	4	1	-	1	-	9	8	7	S.	25	-	5	-	"
Fortress Monroe	64.90	76.23	73.03	71.39	86	56	30	-	1	7	6	8	1	7	-	S.E.	18	3	9	-	"
Augusta Arsl.	70.86	85.33	74.76	76.98	96	64	32	1	1	5	4	5	4	4	6	W.	19	4	7	-	"
Canton. Jesup	75.40	87.93	81.03	81.45	95	63	32	-	3	9	1	13	3	-	1	S.E.	20	5	5	-	"
Canton. Clinch	76.00	85.76	82.40	81.39	90	68	22	-	1	-	-	2	7	18	2	S.W.	21	4	5	-	"
Petite Coquille	79.20	88.06	83.56	83.61	93	68	25	-	3	3	7	6	3	6	2	E.	26	4	-	-	"
Canton. Brooke	77.20	87.53	79.33	81.35	92	74	18	-	-	1	10	-	4	-	15	W.	21	7	2	-	"

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	62.03	70.41	58.36	63.60	84	50	34	-	16	6	2	4	-	3	-	N.W.	5	18	8	-	Cl'dy.
Fort Snelling	71.80	80.64	69.74	74.06	96	60	36	1	4	2	-	3	10	3	8	S.	19	9	3	-	Fair.
Fort Howard	64.93	85.00	66.49	72.14	98	58	40	1	3	8	1	-	3	5	10	W.	27	3	1	-	"
Fort Preble	66.61	79.03	64.54	70.06	89	56	33	2	2	1	1	6	6	11	2	S.W.	19	11	1	-	"
Fort Constitution	66.12	72.83	63.96	67.64	83	57	26	-	7	3	2	2	12	2	3	S.	19	11	1	-	"
Fort Wolcott	66.87	76.38	70.22	71.16	83	58	25	-	7	5	-	3	2	14	-	S.W.	18	6	7	-	"
Fort Armstrong	76.87	84.61	73.67	78.38	94	65	29	4	1	-	2	1	9	9	5	S.	21	10	-	-	"
West Point	70.32	80.58	68.03	72.98	101	64	37	1	5	-	-	4	8	9	4	S.W.	21	8	2	-	"
Fort Trumbull	69.16	76.67	73.64	73.16	86	62	24	1	1	1	1	3	4	17	3	S.W.	22	4	5	-	"
Fort Columbus	71.80	83.25	71.83	75.63	96	63	33	1	6	4	-	7	2	7	4	S.W.	18	6	7	-	"
Washington city	78.41	82.38	79.00	79.93	98	70	28	-	6	10	-	4	3	8	-	N.E.	19	6	6	-	"
Jefferson Barracks	77.48	85.22	77.74	80.15	94	52	42	1	3	-	-	1	3	13	10	S.W.	22	7	2	-	"
Fortress Monroe	74.58	84.38	78.58	79.18	94	70	24	-	-	9	4	8	3	7	-	N.E.	21	5	5	-	"
Augusta Arsl.	77.16	91.77	79.70	82.88	102	72	30	1	-	1	3	11	4	6	5	S.E.	16	5	10	-	"
Canton. Jesup	78.74	89.58	82.54	83.62	95	72	23	2	4	6	5	8	3	1	2	S.E.	13	5	13	-	Cl'dy.
Canton. Clinch	83.48	86.48	83.90	84.62	92	75	17	3	3	1	-	-	3	20	1	S.W.	14	2	15	-	"
Petite Coquille	81.51	88.25	83.74	84.50	93	77	16	2	5	2	6	4	3	7	2	S.W.	23	6	2	-	Fair.
Canton. Brooke	80.38	89.03	79.61	82.85	94	70	24	-	-	4	2	9	15	1	-	S.	20	7	4	-	"

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	60.38	70.12	60.22	63.57	82	42	40	-	11	6	4	8	1	1	-	N.W.	4	20	7	-	Cl'dy.
Fort Snelling	64.67	78.19	68.19	70.35	92	50	42	-	3	7	4	5	9	2	1	S.	15	14	2	-	„
Fort Howard	63.41	82.06	65.04	70.17	88	50	38	1	2	10	1	2	-	6	9	N.E.	21	10	-	-	Fair.
Fort Preble	61.80	76.09	62.32	66.74	95	52	43	-	5	1	3	1	10	11	-	S.W.	24	4	3	-	„
F't Constitution	62.67	70.45	62.35	65.16	92	52	40	-	3	5	1	-	17	3	2	S.	23	5	3	-	„
Fort Wolcott	66.06	73.74	69.03	69.61	86	58	28	2	6	4	-	3	-	16	-	S.W.	18	3	10	-	„
Fort Armstrong	73.80	83.29	72.90	76.66	92	60	32	5	-	3	6	3	7	6	1	S.	26	5	-	-	„
West Point	67.32	80.90	69.48	72.57	101	56	45	1	7	1	-	5	5	7	5	S.W.	15	13	3	-	„
Fort Trumbull	68.03	73.80	72.29	71.39	88	60	28	1	2	4	2	5	3	12	2	S.W.	16	9	6	-	„
Fort Columbus	71.45	79.06	72.51	74.34	95	62	33	5	3	2	-	11	3	2	5	S.E.	20	3	8	-	„
Washington city	76.32	82.06	76.87	78.42	94	70	24	-	-	9	-	11	-	11	-	S.E.	17	8	6	-	„
Jefferson Bar'ks	78.19	85.83	81.00	81.67	92	72	20	-	1	1	9	7	2	10	1	S.W.	23	1	7	-	„
Fortress Monroe	74.54	85.64	80.45	80.21	94	66	28	-	2	9	2	4	4	9	1	S.W.	21	6	4	-	„
Augusta Arsl.	74.71	89.12	80.48	81.44	99	67	32	1	1	7	4	7	4	6	-	S·E.	18	3	10	-	„
Canton. Jesup	77.51	89.38	82.00	82.96	94	74	20	-	5	7	6	5	4	2	2	N.E.	19	2	10	-	„
Canton. Clinch	77.64	86.19	82.61	82.15	92	70	22	3	1	3	1	6	5	11	1	S.W.	22	2	7	-	„
Petite Coquille	78.12	87.22	81.90	82.41	95	71	24	3	3	5	6	6	3	3	2	S.E.	24	5	2	-	„
Canton. Brooke	80.06	88.00	80.12	82.73	94	72	22	2	1	2	-	16	4	2	4	S.E.	15	11	5	-	Cl'dy.

SEPTEMBER.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'y.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.																		
	VII.	II.	IX.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Fort Brady	54.16	66.20	56.26	58.87	81	35	46	-	16	1	-	8	1	3	1	N.W.	3	18	9	-	Cl'dy.
Fort Snelling	55.76	69.06	58.23	61.02	90	32	58	6	3	7	1	3	7	1	2	N.	15	10	5	-	Equal.
Fort Howard	58.46	74.36	59.56	64.12	98	36	62	-	-	10	-	1	3	8	8	N.E.	25	3	2	-	Fair.
Fort Preble	56.36	70.30	57.90	61.52	85	50	35	-	5	1	5	5	5	9	-	S.W.	21	7	2	-	"
Fort Constitu'on	57.10	66.63	57.60	60.44	82	50	32	1	7	9	4	1	7	-	1	N.E.	19	9	2	-	"
Fort Wolcott	59.60	68.46	63.03	63.70	80	50	30	2	5	10	2	-	-	10	1	N.E.	15	6	9	-	Equal.
Fort Armstrong	63.40	72.96	65.93	67.43	90	43	47	2	3	6	5	9	2	3	-	S.E.	26	4	-	-	Fair.
West Point	59.96	74.93	61.56	65.48	88	52	36	5	8	4	1	4	6	2	-	N.W.	21	4	5	-	"
Fort Trumbull	63.30	69.70	67.26	66.75	80	52	28	2	2	10	1	4	1	7	3	N.E.	17	7	6	-	"
Fort Columbus	63.06	72.76	65.33	67.05	84	50	34	12	3	4	-	3	5	2	1	S.	18	8	4	-	"
Washington city	66.60	75.50	68.36	70.15	89	52	37	5	8	4	3	2	5	2	1	N.W.	19	6	5	-	"
Jefferson Bar'ks	69.00	77.43	72.43	72.95	82	52	30	4	8	1	1	1	8	1	6	S.	16	14	-	-	"
Fortress Monroe	66.63	76.26	71.66	71.52	91	56	35	2	7	9	4	4	1	3	-	N.E.	20	9	1	-	"
Augusta Arsl.	67.73	83.06	74.50	75.10	90	56	34	-	3	4	9	8	3	1	2	S.E.	19	5	6	-	"
Canton. Jesup	77.80	87.10	79.76	81.55	94	62	32	-	2	9	5	7	4	1	2	N.E.	23	2	5	-	"
Canton. Clinch	74.06	83.33	79.23	78.87	88	63	25	2	2	1	1	6	2	14	2	S.W.	23	3	4	-	"
Petite Coquille	75.06	85.90	80.93	80.63	91	64	27	1	-	8	3	8	3	6	1	S.E.	25	4	1	-	"
Canton. Brooke	77.13	87.00	79.36	81.16	92	68	24	-	-	8	2	6	3	2	9	W.	19	3	8	-	"

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	40.74	51.42	43.19	45.12	68	23	45	1	11	4	-	8	2	4	1	N.W.	6	18	4	3	Cl'dy.
Fort Snelling	42.00	58.19	47.58	49.26	82	26	56	-	1	-	2	1	2	14	11	S.W.	24	3	4	-	Fair.
Fort Howard	39.64	56.71	44.51	46.95	80	20	60	7	4	3	-	-	14	-	3	S.	23	7	1	-	"
Fort Preble	45.80	56.74	49.06	50.53	71	31	40	-	7	-	3	5	3	9	4	S.W.	19	8	4	-	"
F't Constitution	47.29	56.62	50.29	51.40	70	32	38	1	7	6	-	1	8	5	3	S.	19	9	3	-	"
Fort Wolcott	52.87	60.29	55.03	56.06	70	34	36	7	5	3	-	1	2	9	4	S.W.	12	10	9	-	Cl'dy.
Fort Armstrong	46.12	60.51	50.16	52.26	78	20	58	5	5	4	2	1	6	5	3	N.	27	4	-	-	Fair.
West Point	50.35	60.45	52.54	54.45	74	34	40	4	11	4	2	2	5	1	2	N.W.	17	10	4	-	"
Fort Trumbull	55.03	60.61	58.83	58.16	68	40	28	2	3	7	-	2	6	8	3	S.W.	15	6	10	-	Cl'dy.
Fort Columbus	52.00	60.09	55.61	55.90	71	34	37	8	5	8	-	2	5	2	1	N.	16	15	-	-	Fair.
Washington city	53.67	63.54	58.03	58.41	77	36	41	5	7	1	1	4	5	5	3	N.W.	11	9	11	-	"
Jefferson Bar'ks	54.87	63.38	58.70	58.98	80	36	44	5	9	-	-	2	4	3	8	W.	14	12	5	-	Cl'dy.
Fortress Monroe	58.16	66.74	63.48	62.79	77	39	38	7	5	6	3	5	-	5	-	N.	16	8	7	-	Fair.
Augusta Arsl.	60.09	73.70	66.19	66.66	92	39	53	5	5	3	3	3	3	6	3	S.W.	23	3	5	-	"
Canton. Jesup	60.09	74.35	67.06	67.17	90	40	50	-	8	7	2	8	2	3	1	N.W.	25	4	2	-	"
Canton. Clinch	63.25	73.77	69.96	68.99	85	47	38	7	5	3	1	5	2	5	3	N.	24	1	6	-	"
Petite Coquille	62.83	75.22	69.51	69.19	88	46	42	1	3	7	9	2	3	4	2	E.	27	3	1	-	"
Canton. Brooke	69.87	83.35	71.16	74.79	88	54	34	-	1	-	-	5	4	2	19	W.	25	-	6	-	"

PLACES OF OBSERVATION.	THERMOMETER. Mean Temperature. A.M. VII.	P.M. II.	P.M. IX.	Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	WINDS. N. Days.	N.W. Days.	N.E. Days.	E. Days.	S.E. Days.	S. Days.	S.W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cl'dy. Days.	Rain. Days.	Snow. Days.	Prevailing.
Fort Brady	28.13	34.80	30.53	31.15	51	16	35	3	14	-	10	1	-	1	1	N.W.	10	14	2	4	Cl'dy.
Fort Snelling	26.16	39.66	30.16	31.99	59	-3	62	2	4	1	2	2	2	2	15	W.	15	14	-	1	Fair.
Fort Howard	29.53	40.93	32.10	34.19	64	8	56	6	3	2	1	-	10	2	6	S.	15	15	-	-	Equal.
Fort Preble	28.70	38.36	30.56	32.54	52	13	39	6	7	5	-	-	1	4	7	N.W.	18	9	2	1	Fair.
F't Constitution	31.66	36.50	33.46	33.87	57	20	37	4	17	1	1	2	-	3	2	N.W.	14	14	1	1	Cl'dy.
Fort Wolcott	34.80	41.33	36.96	37.70	57	21	36	2	16	2	-	3	1	2	4	N.W.	11	10	5	4	"
Fort Armstrong	34.10	44.30	37.53	38.64	70	12	58	4	10	-	4	1	1	10	-	S.W.	20	9	1	-	Fair.
West Point	34.40	42.63	36.66	37.90	64	20	44	7	12	2	-	2	1	5	1	N.W.	18	7	5	-	"
Fort Trumbull	39.43	43.66	42.46	41.85	59	32	27	3	9	3	-	2	2	4	7	N.W.	18	4	6	2	"
Fort Columbus	36.90	43.43	38.66	39.66	61	21	40	2	13	5	-	2	1	3	4	N.W.	17	13	-	-	"
Washington city	39.13	49.33	46.16	44.87	67	25	42	-	22	-	1	1	1	5	-	N.W.	10	12	7	1	Cl'dy.
Jefferson Barracks	47.33	53.50	50.36	50.40	74	30	44	3	9	-	3	4	6	3	2	N.W.	10	15	2	3	"
Fortress Monroe	45.16	53.80	50.16	49.71	71	30	41	5	6	1	4	4	-	7	3	S.W.	17	12	1	-	Fair.
Augusta Arsl.	54.03	61.20	57.66	57.63	74	30	44	5	6	2	-	5	-	9	3	S.W.	21	4	5	-	"
Canton. Jesup	55.50	66.30	59.06	60.29	82	36	46	-	2	8	3	10	3	4	-	S.E.	20	5	5	-	"
Canton. Clinch	57.30	66.36	63.46	62.37	77	35	42	6	4	3	2	8	4	3	-	S.E.	20	6	4	-	"
Petite Coquille	57.06	68.30	62.23	62.53	83	39	44	-	10	1	12	1	-	5	1	E.	22	5	3	-	"
Canton. Brooke	64.06	77.26	66.93	69.42	86	46	40	-	5	-	-	7	-	-	18	W.	26	1	3	-	"

No. XII. DECEMBER.

PLACES OF OBSERVATION.	THERMOMETER. Mean Temperature. A.M. VII.	P.M. II.	P.M. IX.	Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	WINDS. N. Days.	N.W. Days.	N.E. Days.	E. Days.	S.E. Days.	S. Days.	S.W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cl'dy. Days.	Rain. Days.	Snow. Days.	Prevailing.
Fort Brady	16.83	23.54	20.61	20.33	38	-5	43	1	7	1	11	7	-	1	3	E.	10	8	-	13	Cl'dy.
Fort Snelling	7.38	19.74	11.90	13.01	33	-14	47	2	4	5	3	1	6	2	8	W.	13	14	-	4	,,
Fort Howard	18.06	25.58	17.64	20.42	48	-7	55	7	4	-	-	2	9	4	3	S.	22	6	3	-	Fair.
Fort Preble	23.67	31.61	27.93	27.74	46	0	46	3	14	6	2	3	1	2	-	N.W.	16	11	2	2	,,
Fort Constitution	26.58	32.90	28.77	29.42	53	-3	56	2	9	5	1	1	2	1	10	W.	12	13	4	2	Cl'dy.
Fort Wolcott	33.19	37.87	35.00	36.35	58	12	46	6	13	6	-	1	-	4	1	N.W.	9	14	4	4	,,
Fort Armstrong	24.38	31.54	27.29	27.74	56	10	46	2	10	2	2	2	8	4	1	N.W.	19	12	-	-	Fair.
West Point	35.03	37.12	32.70	34.95	58	10	48	7	7	4	2	6	4	-	1	N.W.	13	7	8	3	Cl'dy.
Fort Trumbull	40.35	43.67	42.70	42.24	54	23	31	5	5	10	3	1	2	5	-	N.E.	9	12	7	3	,,
Fort Columbus	31.16	35.25	33.22	33.21	48	17	31	2	10	2	3	3	2	4	5	N.W.	15	15	1	-	,,
Washington city	37.28	46.74	40.74	41.59	65	21	44	-	10	5	-	6	1	9	-	N.W.	6	14	10	1	,,
Jefferson Barracks	35.77	43.67	37.83	39.09	64	22	42	5	4	1	1	1	15	2	2	S.	11	11	6	3	,,
Fortress Monroe	46.32	55.25	51.00	50.86	65	34	31	2	3	8	1	5	1	9	2	S.W.	14	15	2	-	,,
Augusta Arsl.	51.09	64.35	56.03	57.16	79	31	48	2	4	2	-	4	8	8	3	S.W.	16	13	2	-	Fair.
Canton. Jesup	53.93	60.51	58.51	57.65	78	32	46	-	6	7	5	9	1	3	-	S.E.	13	10	8	-	Cl'dy.
Canton. Clinch	57.45	65.80	62.93	62.06	78	34	44	1	2	3	2	17	5	1	-	S.E.	21	6	4	-	Fair.
Petite Coquille	59.03	69.41	59.77	62.74	82	41	41	2	2	6	10	10	1	-	-	E.	24	7	-	-	,,
Canton. Brooke	63.48	74.93	64.45	67.62	80	44	36	-	1	-	-	2	1	2	25	W.	29	-	2	-	,,

MEAN OF THE OBSERVATIONS FOR 1827.

PLACES OF OBSERVATION.	Latitude.	Longitude.	THERMOMETER. Mean Temperature. A.M. VII.	P.M. II.	P.M. IX.	Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	WINDS. N. Days.	N.W. Days.	N.E. Days.	E. Days.	S.E. Days.	S. Days.	S.W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cl'dy. Days.	Rain. Days.	Snow Days.	Prevailing.
Fort Brady	46.39	84.83	37.37	48.52	38.54	41.46	84	-20	104	0.75	9.41	4.82	3.08	6.16	0.75	3.00	2.47	N.W.	6.75	15.08	4.50	4.08	Cl'dy.
Fort Snelling	44.53	93.08	41.28	53.44	43.58	46.10	96	-22	118	1.33	2.83	1.92	1.41	2.42	5.75	5.33	9.42	W.	17.08	7.75	3.92	1.67	Fair.
Fort Howard	44.40	87.00	39.38	55.37	42.07	45.60	98	-16	114	2.42	2.17	5.33	1.17	0.83	4.17	5.17	9.00	W.	21.41	7.75	0.92	0.33	„
Fort Preble	43.38	70.18	41.43	53.05	43.31	45.93	95	-8	103	2.42	5.17	2.75	1.58	3.75	4.92	6.17	3.67	S.W.	20.17	6.42	2.83	1.00	„
F't Constitution	43.04	70.49	43.03	51.36	44.26	46.22	92	-8	100	2.00	7.16	3.66	1.42	1.17	8.00	2.58	4.42	N.W.	17.58	9.83	2.33	0.67	„
Fort Wolcott	41.30	71.18	46.25	53.97	48.96	49.73	86	-2	88	2.33	9.58	4.83	0.42	2.25	0.58	9.50	0.92	S.W.	14.33	7.33	6.92	1.83	Cl'dy.
Fort Armstrong	41.28	90.33	47.80	57.84	49.86	51.83	94	-6	100	3.83	5.42	2.58	2.75	2.08	6.83	4.08	2.83	S.	22.50	6.17	1.50	0.25	Fair.
West Point	41.22	73.57	47.09	58.83	49.06	51.66	101	-10	111	4.50	8.25	2.17	0.50	4.83	4.00	3.92	2.25	N.W.	17.83	7.00	4.33	1.16	„
Fort Trumbull	41.22	72.05	49.85	55.46	53.99	53.10	88	0	88	2.08	4.67	5.00	1.33	3.25	3.83	7.16	3.83	S.W.	17.00	6.08	6.25	1.08	„
Fort Columbus	40.42	74.02	48.13	57.21	50.00	51.77	96	0	96	3.75	7.50	3.25	1.08	5.08	3.50	3.08	3.17	N.W.	17.33	7.50	4.83	0.75	„
Washington city	38.41	76.55	53.22	63.67	56.65	57.84	98	9	89	1.75	9.00	5.25	0.58	4.00	2.58	6.00	1.00	N.W.	14.75	9.08	6.25	0.33	Cl'dy.
Jefferson Bar'ks	38.28	90.08	54.42	65.61	57.78	59.27	94	8	86	3.25	4.92	0.58	1.92	3.42	6.67	4.25	5.42	S.	17.75	6.58	4.83	0.92	Fair.
Fortress Monroe	37.02	76.12	55.43	64.91	60.77	60.37	94	13	81	2.00	3.00	6.92	3.42	5.33	1.92	6.16	1.67	N.E.	16.67	8.16	5.58	-	„
Augusta Arsl.	33.28	81.53	61.28	73.22	65.94	66.81	102	26	76	2.08	2.58	3.16	3.00	4.17	3.67	6.50	4.50	S.W.	16.58	6.75	7.08	-	„
Canton. Jesup	31.30	93.47	63.96	75.46	68.25	69.22	95	24	71	1.25	4.83	6.50	3.58	8.17	2.67	2.17	1.17	S.E.	17.67	5.41	7.33	-	„
Canton. Clinch	30.24	87.14	66.12	74.26	70.58	70.32	92	24	68	3.50	3.16	1.75	0.67	5.58	5.08	9.58	1.08	S.W.	19.67	4.67	6.08	-	„
Petite Coquille	30.10	89.38	65.99	76.97	69.42	70.79	95	23	72	1.00	3.33	5.08	6.83	4.67	3.83	3.67	2.00	E.	22.42	6.25	1.75	-	„
Canton. Brooke	27.57	82.35	69.68	81.37	71.49	74.19	94	26	68	0.25	1.67	1.83	1.25	5.83	3.83	3.33	12.42	W.	23.83	3.00	3.58	-	„

PLACES OF OBSERVATION.	THERMOMETER. Mean Temperature. A.M. VII.	P.M. II.	P.M. IX.	Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	WINDS. N. Days.	N.W. Days.	N.E. Days.	E. Days.	S.E. Days.	S. Days.	S.W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cl'dy. Days.	Rain. Days.	Snow. Days.	Prevailing.
Fort Brady	12.70	25.12	17.48	18.43	44	-20	64	1	6	-	5	9	1	3	6	S.E.	6	5	1	19	Cl'dy.
Fort Snelling	3.58	19.35	8.32	10.42	38	-22	60	5	8	-	-	-	6	5	7	N.W.	20	5	-	6	Fair.
Fort Howard	16.32	23.19	17.41	18.97	39	-20	59	4	5	2	1	-	12	5	2	S.	19	6	1	5	Fair.
Fort Preble	23.29	30.45	27.32	27.02	50	2	48	2	5	4	3	9	-	6	2	S.E.	13	16	2	-	Cl'dy.
Fort Constitution	25.51	34.54	28.35	29.37	51	1	50	3	7	4	2	-	3	2	10	W.	16	14	-	1	"
Fort Wolcott	32.35	37.19	34.29	33.95	48	6	42	4	11	5	2	3	1	3	2	N.W.	14	8	7	2	Cl'dy.
Fort Armstrong	19.67	28.67	24.51	24.28	44	-6	50	5	5	2	5	3	5	2	4	N.	19	10	1	1	Fair.
West Point	30.19	38.19	31.87	33.42	56	6	50	4	8	3	-	12	3	1	-	S.E.	16	10	2	3	"
Fort Trumbull	39.41	43.71	42.25	41.86	52	20	32	2	7	5	-	9	2	5	1	S.E.	10	11	1	3	Cl'dy.
Fort Columbus	30.80	36.93	34.03	33.59	54	9	43	5	7	8	3	-	2	4	2	N.E.	12	16	3	-	"
Washington city	37.74	44.84	40.80	41 13	66	16	50	-	8	7	-	6	4	5	1	N.W.	8	11	10	2	"
Jefferson Barracks	31.19	42.16	38.77	37.17	72	10	62	2	6	1	1	1	10	3	7	S.	10	17	4	-	"
Fortress Monroe	45.38	53.80	49.96	49.71	67	32	35	2	6	10	-	-	-	9	4	N.E.	12	11	8	-	"
Fort Gibson	38.83	49.74	44.32	44.26	70	19	51	7	1	4	2	13	2	2	-	S.E.	13	17	-	1	"
Augusta Arsl.	48.96	60.25	54.03	54.41	75	34	41	3	3	3	3	7	4	6	2	S.E.	18	4	9	-	Fair.
Canton. Jesup	51.96	59.48	55.48	55.64	78	32	46	-	5	10	1	6	3	6	-	N.E.	9	4	17	1	Cl'dy.
Canton. Clinch	59.16	65.00	62.74	62.30	76	37	39	7	1	2	-	13	7	-	1	S.E.	9	13	9	-	"
Petite Coquille	57.00	63.00	60.00	60.00	80	36	44	1	9	4	12	1	1	-	3	S.E.	13	18	-	-	"
St. Augustine	66.09	71.19	66.03	67.77	83	49	34	8	-	3	-	9	8	1	2	S.E.	18	13	-	-	Fair.
Canton. Brooke	64.77	76.12	68.41	69.77	84	50	34	11	-	-	-	2	2	5	13	W.	30	-	1	-	"

FEBRUARY.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	12.00	28.48	20.51	20.33	46	-17	63	2	8	2	8	4	-	1	4	E.	11	2	2	14	Cl'dy.
Fort Snelling	8.45	26.96	14.00	16.80	50	-22	72	2	8	-	1	1	6	5	6	N.W.	13	6	-	10	"
Fort Howard	19.06	29.86	21.51	23.48	49	-12	51	9	3	-	-	-	13	-	4	S.	18	11	-	-	Fair.
Fort Preble	30.58	37.58	33.13	33.76	50	10	40	3	8	1	-	3	6	6	2	N.W.	14	9	4	2	Cl'dy.
Fort Constitution	31.10	41.06	34.24	35.47	59	13	46	-	7	2	1	1	5	9	4	S.W.	14	14	1	-	"
Fort Wolcott	36.03	42.00	38.00	38.68	52	19	33	3	7	3	-	4	2	8	2	S.W.	11	7	7	4	"
Fort Armstrong	26.44	36.79	31.00	31.08	58	-2	60	3	4	4	2	2	8	2	4	S.	22	5	1	1	Fair.
West Point	34.58	44.93	38.65	39.39	65	8	57	4	7	1	3	4	6	3	1	N.W.	16	7	4	2	"
Fort Trumbull	41.86	46.37	44.75	44.33	56	28	28	-	6	1	2	4	3	9	4	S.W.	11	6	10	2	Cl'dy.
Fort Columbus	36.65	44.72	42.58	41.32	60	17	43	1	16	3	-	3	-	6	-	N.W.	11	15	3	-	"
Washington city	41.13	55.48	45.16	47.26	65	23	42	1	9	4	-	7	2	5	1	N.W.	13	5	11	-	"
Jefferson Barracks	38.31	48.38	41.76	42.82	70	12	58	-	12	2	3	4	2	1	5	N.W.	14	12	2	1	"
Fortress Monroe	48.93	57.20	54.41	53.51	71	38	33	1	7	7	3	2	3	6	-	N.W.	14	8	7	-	"
Fort Gibson	40.55	54.89	47.44	47.63	69	26	43	2	5	1	3	16	-	2	-	S.E.	15	11	2	1	Fair.
Augusta Arsl.	52.00	63.55	57.44	57.66	76	42	34	6	4	4	1	3	6	3	2	S.	8	9	12	-	Cl'dy.
Canton. Jesup.	55.44	64.31	56.82	58.86	86	36	50	2	2	5	2	9	7	1	1	S.E.	13	1	15	-	"
Canton. Clinch	60.89	67.37	65.13	61.13	76	48	28	3	3	4	4	2	1	12	-	S.W.	13	6	10	-	"
Petite Coquille	60.00	68.00	66.00	64.67	75	44	31	1	4	3	7	1	4	4	5	S.E.	22	1	6	-	Fair.
St. Augustine	71.94	74.37	68.51	71.61	84	52	32	1	3	5	1	7	6	3	3	S.E.	20	8	1	-	"
Canton. Brooke	65.17	78.96	70.40	71.51	82	50	32	4	-	-	-	5	4	10	6	S.W.	25	-	4	-	"

No. III. MARCH.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	19.19	40.09	26.90	28.73	58	–15	73	3	6	2	3	13	2	2	-	S.E.	15	5	3	8	Fair.
Fort Snelling	25.51	41.38	29.83	32.24	56	–18	74	-	8	-	3	1	11	2	6	S.	20	4	3	4	„
Fort Howard	26.87	41.87	31.06	36.60	70	–10	80	4	5	-	-	1	13	4	4	S.	22	9	-	-	„
Fort Preble	30.06	41.00	33.42	34.83	54	10	44	-	10	4	-	9	2	6	-	N.W.	16	11	3	1	„
Fort Constitution	31.96	42.51	33.96	36.14	66	14	52	1	9	3	4	1	7	2	3	N.W.	18	11	1	1	„
Fort Wolcott	35.19	45.77	39.35	40.10	61	17	44	11	5	5	1	2	2	3	2	N.	19	6	3	3	„
Fort Armstrong	34.93	44.38	37.77	35.69	74	6	68	3	1	6	4	1	13	1	2	S.	23	6	1	1	„
West Point	35.83	49.35	40.12	41.77	82	16	66	4	9	3	3	5	3	3	1	N.W.	16	8	5	2	„
Fort Trumbull	40.51	46.93	45.16	43.20	64	26	48	2	5	4	2	6	4	6	2	S.W.	16	8	5	2	„
Fort Columbus	36.96	45.70	39.58	40.75	76	24	52	5	6	5	11	-	-	2	2	E.	17	12	2	-	„
Washington city	40.70	55.29	46.58	47.52	76	23	53	1	7	5	2	9	4	2	1	S.E.	14	10	7	-	Cl'dy.
Jefferson Barracks	42.38	57.70	48.22	49.43	80	14	66	3	11	-	1	-	6	8	2	N.W.	16	12	2	1	Fair.
Fortress Monroe	48.35	56.83	53.12	52.77	71	30	41	3	3	6	-	11	-	6	2	S.E.	15	12	4	-	Cl'dy.
Fort Gibson	47.71	62.38	54.12	54.74	82	28	54	2	8	1	1	19	-	-	-	S.E.	13	17	1	-	„
Augusta Arsl.	52.41	66.87	59.03	59.47	79	33	46	4	2	2	1	8	10	2	2	S.	12	10	9	-	„
Canton. Jesup	55.29	67.93	60.35	61.19	82	42	40	9	2	4	2	4	8	1	1	N.	20	3	8	-	Fair.
Canton. Clinch	59.66	67.53	61.63	62.94	75	40	35	1	5	1	-	8	3	12	1	S.W.	20	4	7	-	„
Petite Coquille	65.00	65.00	63.00	64.33	78	52	26	2	6	8	5	1	4	2	3	S.E.	21	5	5	-	„
St. Augustine	60.32	68.93	63.38	64.21	80	46	34	4	3	7	1	11	1	4	-	S.E.	27	1	3	-	„
Canton. Brooke	60.06	75.42	68.06	64.51	82	46	36	6	1	-	3	4	1	3	13	W.	30	-	1	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	34.33	48.56	35.16	39.35	66	13	53	1	13	1	10	-	1	-	4	N.W.	16	6	4	4	Fair.
Fort Snelling	40.10	52.63	42.40	45.04	78	18	60	1	6	1	6	6	4	1	5	E.	15	5	5	5	Equal.
Fort Howard	36.50	50.33	38.70	41.84	70	21	49	13	5	5	-	1	4	-	2	N.	14	11	2	3	Cl'dy.
Fort Preble	38.33	51.73	39.00	43.02	58	36	22	5	3	4	1	4	2	8	3	S.W.	20	5	4	1	Fair.
Fort Constitution	40.00	48.30	40.43	42.91	61	32	29	2	10	7	3	-	3	2	3	N.W.	17	10	2	1	„
Fort Wolcott	40.13	57.30	43.36	44.93	65	31	34	9	6	4	3	1	-	3	4	N.	11	14	2	3	Cl'dy.
Fort Armstrong	43.76	55.23	45.76	48.25	79	20	59	5	2	6	7	2	4	1	3	E.	19	10	-	1	Fair.
West Point	41.23	55.40	46.53	47.72	68	32	36	6	11	4	1	5	-	3	-	N.W.	17	8	3	2	„
Fort Trumbull	45.36	51.63	49.60	48.86	60	41	19	2	8	6	1	4	1	8	-	S.W.	16	11	3	-	„
Fort Columbus	41.10	50.36	44.36	45.27	69	32	37	2	8	8	2	2	1	4	3	N.W.	10	15	3	2	Cl'dy.
Washington city	45.40	56.66	49.26	50.44	70	32	38	-	15	6	1	5	1	2	-	N.W.	9	10	10	1	„
Jefferson Barracks	49.70	62.76	55.10	55.85	83	24	59	2	10	1	1	2	3	4	7	N.W.	19	2	8	1	Fair.
Fortress Monroe	55.56	61.53	58.50	58.53	71	41	30	2	6	12	-	2	-	5	3	N.E.	13	9	7	1	Cl'dy.
Fort Gibson	53.16	65.23	58.80	59 06	82	28	54	1	5	2	1	21	-	-	-	S.E.	18	7	5	-	Fair.
Augusta Arsl.	57.90	71.80	63.13	64.28	89	35	54	3	4	-	-	5	2	10	6	S.W.	19	8	3	-	„
Canton. Jesup	59.30	72.50	63.10	64.97	85	35	50	2	3	9	5	2	4	5	-	N.E.	20	1	9	-	„
Canton. Clinch	60.06	70.46	66.13	65.55	79	38	51	-	4	2	-	6	8	9	1	S.W.	24	3	3	-	„
Petite Coquille	67.96	72.83	70.63	70.47	85	49	36	-	-	1	11	9	1	2	6	E.	25	2	3	-	„
St. Augustine	66.43	72.73	67.70	68.95	86	30	56	-	3	10	-	13	-	3	1	S.E.	24	3	3	-	„
Canton. Brooke	62.83	77.50	69.20	69.84	90	40	50	5	3	2	1	4	-	7	8	W.	21	4	5	-	„

No. V. MAY.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	58.51	70.25	54.93	61.23	77	34	43	1	6	1	11	1	-	3	8	E.	13	1	16	1	Cl'dy.
Fort Snelling	57.74	66.90	56.19	60.28	76	36	40	1	7	3	5	1	8	5	1	S.	19	2	9	1	Fair.
Fort Howard	50.32	68.83	51.22	56.79	82	30	52	7	3	6	-	-	14	1	-	S.	20	10	1	-	"
Fort Preble	51.25	58.51	48.83	52.86	68	40	28	4	1	7	3	10	4	2	-	S.E.	10	11	10	-	Cl'dy.
Fort Constitution	49.25	68.19	50.32	59.25	74	43	29	-	5	12	2	1	7	1	3	N.E.	15	10	6	-	"
Fort Wolcott	51.41	63.80	53.87	56.36	75	42	33	7	4	2	5	5	-	6	2	N.	14	9	8	-	"
Fort Armstrong	60.06	68.61	57.41	62.03	79	42	37	4	-	4	2	2	11	1	7	S.	21	6	4	-	Fair.
West Point	56.54	70.00	59.74	61.76	80	48	32	2	10	4	-	3	4	5	3	N.W.	14	11	6	-	Cl'dy.
Fort Trumbull	57.71	61.51	59.06	59.43	69	52	17	1	4	6	2	9	1	5	3	S.E.	14	9	8	-	"
Fort Columbus	56.16	66.87	57.18	60.07	78	44	34	2	5	3	2	6	7	3	3	S.	18	5	8	-	Fair.
Washington city	61.61	73.54	65.72	66.96	86	48	38	1	13	3	1	2	9	2	-	N.W.	12	12	7	-	Cl'dy.
Jefferson Barracks	64.70	78.00	67.38	70.03	90	52	38	9	3	3	2	5	3	5	1	N.	25	2	4	-	Fair.
Fortress Monroe	66.22	74.06	70.54	70.27	84	60	24	1	-	12	-	5	1	8	4	N.E.	23	4	4	-	"
Fort Gibson	65.67	79.42	69.00	71.36	86	54	32	-	2	-	-	29	-	-	-	S.E.	17	9	5	-	"
Augusta Arsl.	70.96	83.09	75.67	76.57	94	63	31	2	5	5	-	7	3	3	6	S.E.	19	4	8	-	"
Canton. Jesup	70.29	80.87	73.67	74.94	92	60	32	4	-	4	3	5	8	5	2	S.	24	1	6	-	"
Canton. Clinch	72.41	80.32	75.67	76.13	90	65	25	-	4	1	-	1	3	22	-	S.W.	20	1	10	-	"
Petite Coquille	76.35	81.69	79.19	79.08	90	70	20	1	2	-	8	6	3	5	6	E.	24	1	6	-	Fair.
St. Augustine	75.22	80.45	76.38	77.32	90	71	19	3	-	8	1	14	1	3	1	S.E.	24	3	4	-	"
Canton. Brooke	71.64	80.09	76.48	76.07	90	66	24	-	5	3	3	3	3	11	3	S.W.	24	-	7	-	Cl'dy.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.																		
	VII.	II.	IX.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Fort Brady	49.23	61.53	47.63	52.80	91	39	52	-	1	2	9	4	1	2	11	W.	15	5	10	-	Equal.
Fort Snelling	66.40	79.06	70.00	71.82	92	56	36	-	2	-	1	8	8	5	6	S.	21	-	9	-	Fair.
Fort Howard	67.73	75.26	66.20	69.73	90	48	42	3	4	2	-	5	4	9	3	S.W.	18	11	1	-	„
Fort Preble	63.86	75.96	62.10	67.31	90	48	42	-	3	1	3	6	7	8	2	S.	15	7	8	-	Equal.
Fort Constitution	63.30	69.06	59.80	64.05	90	50	40	1	1	5	2	2	15	2	2	S.	13	16	1	-	Cl'dy.
Fort Wolcott	63.86	72.70	65.80	67.45	81	53	28	-	1	-	1	6	6	16	-	S.W.	13	11	6	-	„
Fort Armstrong	73.54	81.03	72.06	75.54	94	54	40	-	1	3	1	3	16	1	5	S.	27	3	-	-	Fair.
West Point	68.80	82.20	70.56	73.85	98	58	40	1	5	-	-	4	9	8	3	S.	21	7	2	-	„
Fort Trumbull	65.83	73.33	71.13	70.10	82	61	21	-	1	2	3	7	9	7	1	S.	14	10	6	-	Cl'dy.
Fort Columbus	68.33	79.60	68.86	72.26	90	60	30	-	2	2	-	8	6	10	2	S.W.	18	10	2	-	Fair.
Washington city	74.96	85.36	77.56	79.29	93	64	29	2	4	1	-	7	9	6	1	S.	21	4	5	-	„
Jefferson Barracks	77.30	87.83	76.93	80.69	100	66	34	1	3	3	-	11	1	11	-	S.E.	20	-	10	-	„
Fortress Monroe	76.00	83.96	77.30	79.09	91	68	23	-	1	4	2	6	2	14	1	S.W.	19	5	6	-	„
Fort Gibson	77.06	88.20	78.23	81.16	96	66	30	-	1	-	-	26	-	3	-	S.E.	22	4	4	-	„
Augusta Arsl.	80.63	87.63	81.86	83.37	95	62	33	2	9	2	-	7	1	6	3	N.W.	19	4	7	-	„
Canton. Jesup	76.86	90.43	81.10	82.79	97	66	31	-	1	4	-	5	8	11	1	S.W.	23	3	4	-	„
Canton. Clinch	77.23	84.13	81.76	81.04	94	72	22	-	2	3	-	-	-	23	2	S.W.	20	4	6	-	„
Petite Coquille	81.40	86.73	82.16	83.43	93	77	16	-	2	1	2	8	1	7	9	W.	20	6	4	-	„
St. Augustine	79.73	84.03	80.53	81.43	88	74	14	-	1	4	-	23	-	2	-	S.E.	14	6	10		Cl'dy.
Canton. Brooke	74.96	87.43	80.03	80.47	94	70	24	-	6	1	5	2	1	8	7	S.W.	21	-	9		Fair.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M	P.M.	P.M.																		
	VII.	II.	IX.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Fort Brady	61.67	69.96	59.96	67.20	81	47	34	1	1	6	-	-	6	12	5	W.	15	7	9	-	Cl'dy.
Fort Snelling	75.09	82.64	71.48	76.40	90	61	29	1	4	-	-	1	9	4	12	W.	29	-	2	-	Fair.
Fort Howard	65.54	78.29	65.42	69.75	92	56	36	1	2	3	-	4	13	7	1	S.	17	10	4	-	„
Fort Preble	66.25	80.67	65.64	70.85	88	59	29	-	-	-	2	3	16	5	5	S.	22	4	5	-	„
Fort Constitution	66.58	74.77	66.12	69.16	87	50	37	-	2	2	3	1	9	8	6	S.	19	10	2	-	„
Fort Wolcott	67.83	75.83	70.74	71.47	85	62	23	1	5	1	1	3	3	13	4	S.W.	13	11	7	-	Cl'dy.
Fort Armstrong	76.38	83.80	70.38	76.85	94	63	31	6	2	1	1	2	11	4	4	S.	29	2	-	-	Fair.
West Point	71.06	83.64	71.54	75.41	96	64	32	3	10	-	-	1	6	7	4	N.W.	18	6	7	-	„
Fort Trumbull	71.77	77.32	74.61	74.57	86	67	19	-	-	-	-	5	9	17	-	S.W.	25	6	-	-	„
Fort Columbus	70.64	82.58	70.80	74.67	99	63	36	-	1	1	-	4	8	9	8	S.W.	21	3	7	-	„
Washington city	73.90	84.41	76.03	78.11	94	66	28	-	11	1	-	3	4	11	1	S.W.	16	8	7	-	„
Jefferson Barracks	73.03	87.96	77.25	79.41	98	62	36	-	10	11	-	9	-	1	-	N.E.	26	1	4	-	„
Fortress Monroe	75.90	82.93	79.90	79.58	91	69	22	-	1	5	-	2	-	20	3	S.W.	18	7	6	-	„
Fort Gibson	76.19	90.83	78.22	81.75	101	70	31	-	2	3	3	19	1	3	-	S.E.	23	8	-	-	„
Augusta Arsl.	76.48	86.67	81.83	81.66	96	65	31	1	10	-	-	1	-	14	5	S.W.	22	4	5	-	„
Canton. Jesup	77.22	91.25	81.61	83.33	97	75	22	10	4	4	-	5	3	5	-	N.	28	3	-	-	„
Canton. Clinch	77.54	87.38	81.67	82.20	92	70	22	4	7	-	-	2	3	15	-	S.W.	20	5	6	-	„
Petite Coquille	80.83	86.19	82.77	83.26	92	74	18	1	4	3	4	5	1	9	4	S.W.	22	2	7	-	„
St. Augustine	79.58	84.19	81.16	81.64	90	76	14	-	1	5	1	18	1	2	3	S.E.	15	8	8	-	Cl'dy.
Canton. Brooke	76.77	86.64	80.09	81.17	94	70	24	1	2	-	1	4	5	15	3	S.W.	17	-	14	-	Fair.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	60.71	73.00	60.87	64.86	86	49	37	-	2	5	4	1	5	12	2	W.	15	11	5	-	Cl'dy.
Fort Snelling	72.19	81.03	70.16	74.46	88	58	30	2	1	-	-	1	9	8	10	W.	26	4	1	-	Fair.
Fort Howard	64.03	77.51	67.54	69.69	92	48	44	2	3	6	-	5	11	2	2	S.	14	3	14	-	Cl'dy.
Fort Preble	66.45	80.83	64.70	70.66	90	58	32	-	5	1	2	5	9	5	4	S.	26	1	4	-	Fair.
Fort Constitution	65.70	73.25	66.22	68.36	86	58	28	-	4	3	1	2	14	2	5	S.	26	5	-	-	„
Fort Wolcott	68.41	77.74	71.96	72.70	86	63	23	2	3	1	1	2	5	13	4	S.W.	22	5	4	-	„
Fort Armstrong	75.03	84.16	71.00	76.73	95	64	31	-	1	2	4	3	14	1	6	S.	28	2	1	-	„
West Point	70.96	85.41	73.38	76.58	90	63	27	1	6	-	-	1	9	9	5	S.W.	27	1	3	-	„
Fort Trumbull	71.80	77.72	75.00	74.84	86	65	21	1	5	3	1	2	2	17	-	S.W.	26	2	3	-	„
Fort Columbus	72.00	85.61	71.90	76.50	95	63	32	-	1	3	1	2	13	4	7	S.	24	4	3	-	„
Washington city	73.74	85.32	78.22	79.09	93	65	28	-	7	4	-	5	12	3	-	S.	17	8	6	-	„
Jefferson Barracks	73.09	91.80	79.80	81.56	100	64	36	-	4	4	-	13	-	9	1	S.E.	22	1	8	-	„
Fortress Monroe	76.96	83.87	80.71	80.51	91	71	20	-	-	5	1	7	3	9	6	S.W.	21	5	5	-	„
Fort Gibson	76.77	91.48	77.87	82.04	100	71	29	-	-	1	3	24	2	1	-	S.E.	22	9	-	-	„
Augusta Arsl.	76.70	87.09	81.03	81.61	95	72	23	3	7	7	-	6	2	2	4	N.W.	5	19	7	-	Cl'dy
Canton. Jesup	77.32	88.61	80.41	82.11	96	72	24	2	-	11	-	7	6	4	1	N.E.	14	17	-	-	„
Canton. Clinch	78.58	86.80	81.22	82.20	91	74	17	2	5	2	2	2	3	13	2	S.W.	14	-	17	-	„
Petite Coquille	80.83	86.09	83.03	83.32	92	74	18	1	1	2	10	4	2	9	2	E.	13	4	14	-	„
St. Augustine	80.54	84.64	80.83	82.00	87	78	9	-	2	-	1	24	-	4	-	S.E.	13	10	8	-	„
Canton. Brooke	76.87	88.25	80.16	81.70	94	74	20	-	1	-	5	5	12	8	-	S.	17	-	14	-	Fair.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	52.26	62.06	50.23	54.85	76	38	38	2	2	6	2	1	7	8	2	W.	10	10	10	-	Cl'dy.
Fort Snelling	55.30	65.90	55.30	58.83	78	44	34	4	2	1	1	2	3	7	10	W.	22	6	2	-	Fair.
Fort Howard	48.60	63.60	53.70	55.30	79	35	34	7	1	1	-	6	9	3	3	S.	9	14	7	-	Cl'dy.
Fort Preble	58.60	68.53	59.40	62.18	68	48	20	1	2	9	3	5	9	1	-	N.E.	17	11	2	-	Fair.
Fort Constitution	58.36	68.23	60.13	62.24	79	50	29	2	1	7	4	2	7	4	3	S.	17	10	3	-	„
Fort Wolcott	62.26	70.53	65.00	65.93	82	56	26	6	3	4	1	2	2	12	-	S.W.	17	8	5	-	„
Fort Armstrong	56.20	69.26	57.06	60.84	82	44	38	8	3	1	3	4	6	2	3	N.	19	8	3	-	„
West Point	65.23	71.66	69.03	68.64	90	58	32	3	6	1	-	3	4	8	5	S.W.	20	2	8	-	„
Fort Trumbull	66.83	71.80	69.26	69.30	86	60	26	3	-	10	3	4	2	6	2	N.E.	15	9	6	-	Equal.
Fort Columbus	61.26	76.70	62.40	66.79	92	53	39	1	2	8	1	1	4	8	5	S.W.	21	2	7	-	Fair.
Washington city	62.13	74.23	65.86	67.41	94	50	44	1	9	4	-	5	8	2	1	N.W.	15	9	6	-	Equal.
Jefferson Barracks	61.93	74.40	66.33	67.89	86	52	34	-	6	6	-	10	-	7	1	S.E.	24	-	6	-	Fair.
Fortress Monroe	69.56	73.46	70.90	71.31	83	59	24	2	2	14	2	3	-	4	3	N.E.	13	9	8	-	Cl'dy.
Fort Gibson	64.13	79.73	65.30	69.72	92	48	44	8	1	-	2	18	1	-	-	S.E.	19	11	-	-	Fair.
Augusta Arsl.	65.53	78.96	71.90	72.13	88	58	30	3	9	8	-	2	1	5	2	N.W.	12	16	2	-	Cl'dy.
Canton. Jesup	67.80	80.63	71.93	73.45	90	62	28	6	1	16	3	1	2	1	-	N.E.	19	8	3	-	Fair.
Canton. Clinch	70.26	82.33	76.06	76.22	87	56	31	2	3	4	2	5	4	10	-	S.W.	24	1	5	-	„
Petite Coquille	74.76	82.03	79.06	78.62	88	65	23	-	5	5	7	6	1	2	4	E.	24	2	4	-	„
St. Augustine	77.43	82.30	79.26	79.66	85	72	13	-	2	8	1	17	-	2	-	S.E.	15	7	8	-	Equal.
Canton. Brooke	73.96	86.10	77.93	79.33	92	68	24	-	-	-	8	10	2	6	4	S.E.	22	-	8	-	Fair.

OCTOBER.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	43.03	51.35	42.22	45.53	70	27	43	1	2	7	4	4	2	9	2	S.W.	10	14	5	2	Cl'dy.
Fort Snelling	42.00	60.25	48.12	50.12	80	28	52	3	4	-	1	2	2	8	11	W.	27	3	1	-	Fair.
Fort Howard	38.80	58.58	47.90	48.43	82	24	58	7	1	1	-	3	7	7	5	S.W.	16	15	-	-	"
Fort Preble	44.12	57.38	45.80	49.10	68	28	40	-	5	-	1	3	16	5	1	S.	17	10	4	-	"
Fort Constitution	44.61	57.25	49.35	50.40	74	30	44	-	8	1	1	3	8	5	5	N.W.	18	12	1	-	"
Fort Wolcott	49.96	58.80	53.93	54.23	67	34	33	-	12	5	1	1	1	10	1	N.W.	15	12	4	-	Cl'dy.
Fort Armstrong	49.03	60.93	52.90	54.29	82	34	48	5	2	1	2	3	14	-	4	S.	30	1	-	-	Fair.
West Point	50.19	61.67	55.12	55.99	73	30	43	-	13	-	1	3	5	5	4	N.W.	21	7	3	-	"
Fort Trumbull	55.09	60.19	58.83	58.04	70	44	26	1	5	1	5	4	2	8	5	S.W.	22	6	3	-	"
Fort Columbus	48.09	60.00	52.09	53.39	71	33	38	2	8	2	3	3	5	7	1	N.W.	22	6	3	-	"
Washington city	45.80	64.09	54.48	54.79	76	27	49	-	8	5	-	1	12	4	1	S.	19	9	3	-	"
Jefferson Barracks	43.29	59.22	49.74	50.75	70	34	36	-	2	3	2	8	2	11	3	S.W.	26	3	2	-	"
Fortress Monroe	60.45	66.16	63.25	63.29	70	49	21	1	2	13	1	5	2	4	3	N.E.	17	8	6	-	"
Fort Gibson	60.19	77.03	60.83	66.02	90	46	44	-	6	-	-	25	-	-	-	S.E.	22	7	2	-	"
Augusta Arsl.	57.93	71.35	84.93	71.40	81	41	40	7	13	5	1	1	-	2	2	N.W.	22	6	3	-	"
Canton. Jesup	61.74	76.29	65.22	67.75	84	48	36	4	4	7	5	4	3	4	-	N.E.	23	7	1	-	"
Canton. Clinch	62.87	76.90	68.83	69.53	83	46	37	7	1	5	3	6	5	4	-	N.	28	-	3	-	"
Petite Coquille	70.80	76.80	74.51	74.04	84	56	28	1	7	2	11	2	-	2	6	E.	26	2	3	-	"
St. Augustine	69.74	75.06	71.29	72.03	80	56	24	3	3	13	1	9	-	2	-	N.E.	14	9	8	-	Cl'dy.
Canton. Brooke	67.29	82.25	72.29	73.94	86	47	39	2	5	3	7	4	-	10	-	S.W.	24	5	2	-	Fair.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M. VII.	P.M. II.	P.M. IX.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
Fort Brady	31.06	38.63	33.80	34.50	59	21	38	5	2	5	6	3	2	3	4	E.	5	25	-	-	Cl'dy.
Fort Snelling	30.70	40.23	34.60	35.18	55	18	37	2	6	3	-	1	2	5	11	W.	7	13	2	8	"
Fort Howard	30.93	38.73	34.13	34.60	53	15	38	-	6	6	1	1	1	10	5	S.W.	10	20	-	-	"
Fort Preble	36.40	43.66	37.33	39.13	58	22	36	3	5	1	-	4	8	4	5	S.	8	10	8	4	"
Fort Constitution	38.86	46.50	40.20	41.85	66	24	32	1	9	3	2	-	4	4	7	N.W.	17	9	4	-	Fair.
Fort Wolcott	43.16	48.96	45.20	45.77	65	26	39	1	11	4	2	1	1	9	1	N.W.	13	7	9	1	Cl'dy.
Fort Armstrong	37.50	47.13	38.03	40.89	62	30	32	6	1	1	5	2	10	2	3	S.	20	7	2	1	Fair.
West Point	41.56	49.43	44.10	45.03	68	24	44	2	9	-	1	5	6	6	1	N.W.	13	6	10	1	Cl'dy.
Fort Trumbull	49.40	53.56	51.66	51.54	67	40	27	3	4	1	5	5	3	3	6	W.	12	5	12	1	"
Fort Columbus	42.66	48.00	44.16	44.94	63	27	36	-	9	5	1	1	3	4	7	N.W.	19	1	9	1	Fair.
Washington city	42.60	52.80	46.60	47.33	70	29	41	-	10	5	-	5	6	4	-	N.W.	11	11	6	2	Cl'dy.
Jefferson Barracks	43.33	60.06	48.26	50.55	70	34	36	3	4	4	1	7	1	10	-	S.W.	25	1	3	1	Fair.
Fortress Monroe	54.13	59.90	56.90	56.98	82	38	44	3	2	9	1	2	-	8	5	N.E.	17	5	8	-	"
Fort Gibson	48.40	66.06	51.70	55.39	80	38	42	5	3	-	3	17	-	1	1	S.E.	24	6	-	-	"
Augusta Arsl.	53.50	60.80	55.93	56.74	75	41	34	1	9	3	-	-	2	10	5	S.W.	24	3	3	-	"
Cant. Jesup	53.26	67.63	57.40	59.43	80	30	50	3	8	3	1	7	3	3	2	N.W.	20	9	1	-	"
Cant. Clinch	57.43	67.76	60.80	62.00	80	36	44	1	11	2	-	2	8	4	2	N.W.	21	2	7	-	"
Petite Coquille	63.83	70.90	66.36	67.03	78	49	29	-	5	-	6	6	1	6	6	S.E.	23	3	4	-	"
St. Augustine	64.20	69.16	65.63	66.33	81	54	27	2	12	1	1	14	-	-	-	S.E.	24	2	4	-	"
Cant. Brooke	60.73	77.00	67.10	68.28	82	46	36	3	4	3	3	1	1	11	4	S.W.	26	-	4	-	"

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Fort Brady	19.67	28.29	23.25	23.74	42	2	40	2	7	8	-	-	4	5	5	N.E.	5	26	-	-	Cl'dy.
Fort Snelling	20.06	30.74	23.80	24.87	44	-3	47	6	4	2	-	1	2	5	11	W.	18	11	-	2	Fair.
Fort Howard	20.87	29.22	23.64	24.58	43	-6	49	2	5	1	1	1	3	12	6	S.W.	21	10	-	-	,,
Fort Preble	28.53	37.22	31.54	32.43	52	-2	54	-	7	2	1	1	8	9	3	S.W.	16	15	-	-	,,
Fort Constitution	31.00	40.64	33.38	35.01	57	4	53	-	11	-	1	-	-	13	6	S.W.	19	12	-	-	,,
Fort Wolcott	34.96	43.32	36.93	38.40	57	10	47	1	9	1	-	1	2	11	6	S.W.	5	14	12	-	Cl'dy.
Fort Armstrong	29.93	39.83	30.64	33.47	59	10	49	6	-	-	1	3	11	3	7	S.	25	5	1	-	Fair.
West Point	35.67	46.71	37.54	39.97	62	12	50	2	10	3	-	-	11	3	2	S.	23	6	2	-	,,
Fort Trumbull	42.45	48.74	45.80	45.66	58	18	40	1	1	1	1	3	2	8	14	W.	22	5	4	-	,,
Fort Columbus	35.19	43.06	37.77	38.67	54	20	34	-	13	-	-	-	7	9	2	N.W.	24	4	3	-	,,
Washington city	35.77	49.09	40.35	41.74	62	18	44	1	13	3	-	2	8	4	-	N.W.	18	10	3	-	,,
Jefferson Barracks	38.35	52.87	43.32	44.85	60	30	30	10	1	3	-	9	2	5	1	N.	24	3	4	-	,,
Fortress Monroe	44.09	50.70	47.93	47.57	64	30	34	5	11	5	1	1	4	3	1	N.W.	22	5	4	-	,,
Fort Gibson	40.54	57.03	46.00	47.86	74	26	48	-	5	8	-	18	-	-	-	S.E.	20	5	6	-	,,
Augusta Arsl.	49.03	60.54	53.74	54.44	72	34	38	3	7	5	-	2	6	4	4	N.W.	21	4	6	-	,,
Canton. Jesup	49.71	60.00	54.00	54.57	74	34	40	5	8	6	-	7	2	3	-	N.W.	14	8	9	-	Cl'dy.
Canton. Clinch	59.00	66.00	61.00	62.00	75	50	25	-	6	4	2	-	12	3	4	S.	21	-	10	-	Fair.
Petite Coquille	61.96	68.06	62.83	64.28	80	48	32	2	4	6	8	6	-	2	3	E.	20	9	2	-	,,
St. Augustine	64.93	69.93	65.85	66.90	77	50	27	3	10	4	-	13	1	-	-	S.E.	15	7	9	-	Cl'dy.
Canton. Brooke	64.54	76.29	69.12	69.98	82	50	32	1	-	9	6	8	4	3	-	N.E.	25	1	5	-	Fair.

No. XIII. **MEAN OF THE OBSERVATIONS FOR 1828.**

PLACES OF OBSERVATION.	Latitude.	Longitude.	THERMOMETER. Mean Temperature. A.M. VII.	P.M. II.	P.M. IX.	Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	WINDS. N. Days.	N.W. Days.	N.E. Days.	E. Days.	S.E. Days.	S. Days.	S.W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cl'dy. Days.	Rain. Days.	Snow Days.	Prevailing.
Fort Brady	46° 39′	84.83′	37.95	49.78	39.41	42.38	91	-20	111	1.59	4.67	3.75	5.17	3.33	2.59	5.00	4.42	S.W.	11.33	9.75	5.42	4.00	Cl'dy.
Fort Snelling	44.53	93 08	41.43	53.92	43.68	46.34	92	-22	114	2.25	5.00	0.83	1.50	2.08	5.83	5.00	8.00	W.	19.75	4.92	2 83	3.00	Fair.
Fort Howard	44.40	87·00	40.46	53.19	43.20	45.62	92	-20	112	4.92	3.58	2.75	0.25	2.25	8.67	5.00	3.08	S.	16.50	10.83	2.50	0.67	,,
Fort Preble	43.38	70.18	44.81	55.29	45.68	48.5¢	90	-2	92	1.50	4.50	2.83	1.58	5.17	7.25	5.42	2.25	S.	16 17	10.00	4.50	0.67	,,
F't Constitution	43.04	70.49	45.52	55.36	46.87	49 25	90	1	89	0.83	6.17	4.08	2.17	1.08	6.83	4.50	4.75	S.	16.25	11.25	2.75	0.25	,,
Fort Wolcott	41.30	71.18	48.80	57.33	51.53	52.55	86	6	80	3.75	6.42	2.92	1.50	2.58	2.08	8.92	2.33	N.W.	13.92	9.33	6.17	1.08	Cl'dy.
Fort Armstrong	41.28	90.33	48.54	58.33	49.04	51.97	95	-6	101	4.25	1.83	2.58	3.08	2.50	10.25	1.67	4.33	S.	23.50	5.42	1.17	0.42	Fair.
West Point	41.22	73.57	50.15	61.55	53.18	54.96	98	6	92	2.67	8 67	1.58	0.75	3.83	5.50	5.08	2.42	N.W.	18.50	6.58	4.58	0.83	,,
Fort Trumbull	41.22	72.05	54.00	59.40	57.26	56.89	86	18	68	1.33	3.83	3.33	2.08	5.17	3.33	7.00	4 58	S.W.	16.92	7.33	5.08	0.67	,,
Fort Columbus	40.42	74.02	49.99	60.01	52.14	54.05	99	9	90	1.50	6.50	4.00	2.00	2.50	4.67	5.83	3.50	N.W.	18.08	7.75	4.42	0.25	,,
Washington city	38.41	76.55	52.96	65.18	57.22	58.45	94	16	78	0.58	9.50	4.00	0.33	4.75	6.58	4.17	0.58	N.W.	14.42	8.92	6.75	0.42	Cl'dy.
Jefferson Bar'ks	38.28	90.08	53.05	66.93	57.74	59.24	100	10	90	2.50	6.00	3.42	0.92	6.58	2.50	6.58	2.00	S.W.	20.83	4.50	4.75	0.33	Fair.
Fortress Monroe	37.02	76.12	60.13	67.03	63.62	63.59	91	30	61	1.67	3.42	8.50	0.92	3.83	1.25	8.00	2.92	N.E.	17.00	7.33	6.08	0.08	,,
Fort Gibson	35.30	95.10	57.43	71.83	60.99	63.42	101	19	82	2.08	3.25	1.67	1.50	20.42	0.50	1.00	0.08	S.E.	19.00	9.25	2.08	0.17	,,
Augusta Arsl.	33.28	81.53	61.84	73.22	68.38	67.81	96	34	62	3.17	6.83	3.67	0.50	4.08	3.08	5.58	3.58	N.W.	16.75	7.58	6.17	0.00	,,
Canton. Jesup	31.30	93.47	63.02	74.99	66.76	68.26	97	30	67	3.92	3.17	6.92	1.83	5.17	4.75	4.08	0.67	N.E.	18.92	5.42	6.08	0.08	,,
Canton. Clinch	30.24	87.14	66.26	75.16	70.22	70.55	94	36	58	2.25	4.33	2.50	1.08	3.92	4.75	10.58	1.08	S.W.	19.50	3.25	7.75	0.00	,,
Petite Coquille	30.10	89.38	70.06	75.61	72.46	72.71	93	36	57	0.83	4.08	2.92	7.58	4.58	1.58	4.17	4.75	E.	21.18	4.58	4.00	0.00	,,
St. Augustine	29.48	81.35	71.35	76.41	72.21	73.32	90	30	60	2.00	3.33	5.67	0.67	14.33	1.50	2.17	0.83	S.E.	18.58	6.42	5.50	-	,,
Canton. Brooke	27.57	82.35	68.30	81.00	73.27	74.19	94	40	54	2.75	2.25	1.75	3.50	4.33	2.92	8.08	5.08	S.W.	23.50	0.83	6.17	-	,,

JANUARY.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Hancock Barracks	7.16	15.16	13.25	11.86	47	-24	71	2	14	9	-	6	-	-	-	N.W.	21	-	3	7	Fair.
Fort Snelling	10.80	21.16	15.96	15.97	38	-18	56	-	7	1	-	2	3	11	7	S.W.	24	6	-	1	„
Fort Howard	13.64	24.93	18.29	18.95	49	-8	57	5	5	5	1	1	-	12	2	S.W.	13	18	-	-	Cl'dy.
Fort Preble	16.00	25.35	20.71	20.69	40	-6	46	6	7	4	2	-	3	6	3	N.W.	14	12	4	1	„
Fort Niagara	25.22	31.48	26.64	27.78	54	3	51	2	7	5	1	1	10	4	1	S.	15	10	1	5	„
Fort Constitution	20.87	28.94	23.32	24.38	50	-6	56	6	9	4	-	-	2	3	7	N.W.	13	13	3	2	„
Fort Wolcott	25.51	33.58	27.61	28.90	50	6	44	3	7	3	3	1	1	8	5	S.W.	14	10	5	2	„
Fort Armstrong	20.92	33.22	23.12	25.75	55	-2	57	13	1	-	4	4	6	1	2	N.	22	8	-	1	Fair.
West Point	23.51	32.64	25.16	27.10	56	0	56	2	15	3	1	4	-	5	1	N.W.	15	4	6	6	Cl'dy.
Fort Columbus	25.03	29.51	26.61	27.05	44	7	37	-	12	11	-	4	-	4	-	N.W.	21	1	5	4	Fair.
Washington city	27.58	38.77	31.87	32.74	54	12	42	1	11	7	-	7	3	2	-	N.W.	14	10	3	4	Cl'dy.
Jefferson Barracks	30.61	43.12	35.19	36.31	56	14	42	9	8	7	-	2	2	3	-	N.	22	4	3	2	Fair.
Fortress Monroe	37.16	45.48	41.77	41.47	60	21	39	11	6	6	1	3	-	2	2	N.	16	9	6	-	„
Fort Gibson	34.19	57.35	42.03	44.52	78	20	58	5	1	4	-	20	-	1	-	S.E.	22	7	1	1	„
Augusta Arsl.	40.22	53.67	47.03	46.97	68	15	53	2	5	1	3	8	2	5	5	S.E.	19	5	7	-	„
Canton. Jesup	45.96	58.32	51.09	51.79	74	24	50	5	4	4	-	7	2	9	-	S.W.	17	10	4	-	„
Canton. Clinch	49.97	57.61	56.70	54.76	74	26	48	3	6	12	-	2	7	1	-	N.E.	21	3	7	-	„
Petite Coquille	51.93	60.90	54.06	55.63	72	23	49	2	7	3	6	2	3	6	2	N.W.	19	9	3	-	„

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Hancock Barracks	9.92	20.71	14.82	15.15	40	−7	47	3	12	8	-	3	-	2	-	N.W.	16	-	-	12	Fair.
Fort Snelling	8.07	11.95	2.50	7.51	33	−30	63	2	5	-	-	-	3	3	15	W.	22	2	-	4	„
Fort Howard	−3.17	16.74	7.07	6.88	41	−32	73	6	2	4	1	1	4	6	4	S.W.	12	16	-	-	Cl'dy.
Fort Preble	12.07	29.21	20.64	20.64	34	−2	36	-	3	3	4	2	4	5	7	W.	17	8	1	2	Fair.
Fort Niagara	19.10	25.89	19.96	21.65	52	0	52	1	4	3	-	-	4	8	8	S.W.	15	11	-	2	„
Fort Constitution	16.89	29.07	22.42	22.79	40	5	35	-	13	4	1	-	1	3	6	N.W.	19	9	-	-	„
Fort Wolcott	20.03	30.82	24.07	24.97	42	9	31	1	8	1	4	-	-	3	11	W.	17	2	3	6	„
Fort Armstrong	7.67	18.17	11.38	12.41	50	−16	66	8	2	2	1	-	7	-	8	N.	24	2	-	2	„
West Point	17.10	29.39	22.00	22.83	40	2	38	4	16	1	-	7	-	-	-	N.W.	18	2	2	6	„
Fort Columbus	21.57	30.07	24.67	25.44	41	11	30	-	13	4	1	-	1	3	6	N.W.	19	9	-	-	„
Washington city	22.07	35.42	28.38	28.62	46	8	38	1	16	3	1	2	1	4	-	N.W.	12	10	3	3	Cl'dy.
Jefferson Barracks	14.28	27.03	20.25	20.52	70	1	69	1	9	5	2	8	-	1	2	N.W.	19	3	3	3	Fair.
Fortress Monroe	32.21	39.86	36.14	36.07	54	22	32	7	6	8	-	-	1	3	3	N.E.	11	8	6	3	Cl'dy.
Fort Gibson	22.85	37.51	25.58	28.65	66	0	66	3	3	7	1	11	1	2	-	S.E.	19	8	1	-	Fair.
Augusta Arsl.	37.00	49.89	43.92	40.27	64	25	39	-	15	8	2	2	-	-	1	N.W	10	8	10	-	Cl'dy.
Canton. Jesup	36.85	53.85	45.10	45.27	72	18	54	6	10	4	-	-	2	6	-	N.W.	16	11	1	-	Fair.
Canton. Clinch	47.42	55.82	53.57	52.27	70	30	40	13	4	1	-	-	10	-	-	N.	11	7	9	1	Cl'dy.
Petite Coquille	48.25	56.10	49.17	51.17	70	28	42	4	2	4	6	3	-	4	5	E.	15	11	2	-	Fair.

No. III.

MARCH.

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Hancock Barracks	18.87	32.02	25.06	25.32	52	−1	53	2	4	8	3	10	-	4	-	S.E.	23	-	1	7	Fair.
Fort Snelling	21.93	39.51	28.16	29.87	66	0	66	1	-	-	2	2	8	5	13	W.	20	5	3	3	,,
Fort Howard	18.80	35.67	26.83	27.10	61	2	59	2	2	5	2	7	5	8	-	S.W.	15	16	-	-	Cl'dy.
Fort Preble	26.71	37.42	28.38	30.84	56	6	50	1	11	3	2	-	7	3	4	N.W.	16	13	1	1	Fair.
Fort Niagara	29.09	36.05	32.03	32.72	50	19	31	3	12	4	3	1	3	2	3	N.W.	14	14	-	3	Cl'dy.
Fort Constitution	26.45	37.80	29.61	31.29	60	12	48	2	12	4	-	-	4	4	5	N.W.	15	13	1	2	,,
Fort Wolcott	27.74	39.51	31.38	32.88	52	18	34	2	10	3	-	-	1	4	11	W.	20	4	4	3	Fair.
Fort Armstrong	28.12	39.90	29.67	32.56	66	9	55	4	1	3	2	2	11	2	6	S.	20	4	2	5	,,
West Point	28.77	42.16	33.48	34.80	68	17	51	3	19	-	1	5	1	1	1	N.W.	16	8	2	5	,,
Fort Columbus	31.41	48.45	33.77	37.88	78	24	54	-	21	6	-	1	-	3	-	N.W.	24	1	3	3	,,
Washington city	32.45	47.22	39.22	39.63	68	20	48	1	15	3	-	6	4	2	-	N.W.	12	12	5	2	Cl'dy.
Jefferson Barracks	35.87	50.77	41.16	42.60	70	55	15	-	4	3	1	14	-	9	-	S.E.	20	4	5	2	Fair.
Fortress Monroe	38.70	47.67	44.61	43.66	64	24	40	1	4	9	-	-	1	13	3	S.W.	14	10	5	2	Cl'dy.
Fort Gibson	39.38	55.93	50.64	48.32	76	24	52	-	1	11	1	18	-	-	-	S.E.	17	9	4	1	Fair.
Augusta Arsl.	40.80	57.83	51.12	49.92	77	29	46	2	8	3	-	5	1	6	6	N.W.	19	3	9	-	,,
Canton. Jesup	45.68	61.09	52.48	53.08	78	30	48	1	7	1	1	6	2	9	4	S.W.	17	8	6	-	,,
Canton. Clinch	50.64	60.61	56.96	56.07	70	36	34	8	-	-	14	1	6	-	2	E.	16	11	4	-	,,
Petite Coquille	54.80	66.03	54.93	58.55	78	42	36	1	8	5	5	3	1	6	2	N.W.	21	8	2	-	,,

PLACES OF OBSERVATION.	THERMOMETER.							WINDS.									WEATHER.				
	Mean Temperature.			Aggregate Mean Temperature.	Highest degree.	Lowest degree.	Range.	N.	N.W.	N.E.	E.	S.E.	S.	S.W.	W.	Prevailing.	Fair.	Cl'dy.	Rain.	Snow.	Prevailing.
	A.M.	P.M.	P.M.					Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	Days.	
	VII.	II.	IX.																		
Hancock Barracks	33.60	48.73	41.60	41.31	67	22	45	1	7	5	4	8	2	3	-	S.E.	20	-	10	-	Fair.
Fort Snelling	43.46	56.13	44.50	48.03	84	20	54	1	7	1	1	1	8	3	8	S.	24	2	4	-	„
Fort Howard	34.33	48.13	38.03	40.16	76	26	50	8	5	4	1	2	5	5	-	N.	7	23	-	-	Cl'dy.
Fort Preble	39.86	52.06	40.26	44.06	66	32	34	2	5	4	2	3	8	3	3	S.	16	8	6	-	Fair.
Fort Niagara	40.23	53.10	43.06	45.46	79	32	47	5	2	5	-	3	4	4	7	W.	16	8	5	1	„
Fort Constitution	40.76	49.63	41.20	43.86	58	34	24	1	3	6	6	-	8	3	3	S.	18	9	3	-	„
Fort Wolcott	39.23	52.83	41.96	44.67	63	34	29	-	9	4	2	5	-	8	2	N.W.	15	9	6	-	Equal.
Fort Armstrong	45.86	56.86	46.46	49.73	84	34	50	10	2	2	3	-	10	-	3	N.	23	2	5	-	Fair.
West Point	43.00	58.10	48.06	49.72	86	34	52	3	9	-	1	5	2	4	6	N.W.	18	6	5	1	„
Fort Columbus	46.30	64.10	46.40	52.27	82	36	46	-	17	3	-	3	-	5	2	N.W.	22	2	6	-	„
Washington city	45.46	63.83	53.80	54.36	82	36	46	-	16	1	-	2	7	4	-	N.W.	13	11	6	-	„
Jefferson Barracks	52.56	68.30	59.66	60.17	80	48	32	1	2	1	3	11	2	10	-	S.E.	21	9	-	-	„
Fortress Monroe	51.73	61.00	57.83	56.85	81	40	41	-	-	4	1	6	2	13	4	S.W.	19	7	4	-	„
Fort Gibson	51.06	69.33	58.13	59.51	92	36	56	3	9	-	2	5	5	5	1	N.W.	18	9	3	-	„
Augusta Arsl.	49.90	68.63	59.66	59.40	83	33	50	3	6	1	-	1	-	13	6	S.W.	23	3	4	-	„
Canton. Jesup	53.70	72.30	61.03	62.34	87	40	47	3	9	-	2	5	5	5	1	N.W.	18	9	3	-	„
Canton. Clinch	60.16	69.30	65.90	65.12	78	46	32	6	-	-	-	-	19	-	5	S.	18	10	2	-	„
Petite Coquille	62.00	71.60	63.73	65.78	80	50	30	4	12	4	1	3	1	3	2	N.W.	18	9	3	-	„

Just Published,

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ON THE

THEORY AND PRACTICE

OF

PHYSIC.

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LECTURER AT THE MEDICAL SCHOOL, PARK STREET, DUBLIN; PHYSICIAN TO THE MEATH HOSPITAL, ETC., ETC.

SECOND AMERICAN EDITION.

WITH

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EDITOR'S PREFACE.

In yielding to the wish of the publishers that he would become annotator to the "Lectures" of Doctor Stokes, and make additions on subjects not included in the course of the distinguished lecturer in the Park Street Medical School, the editor was not unmindful of the responsibility of his task, nor of the comparisons to which his labours would be subjected by critical readers. Mere self-regard would have made him prefer to be the author of a separate work on the Practice of Medicine; in which scope would have been allowed him for various topics necessarily omitted on the present occasion. But he was consoled by the reflexion, that, next to the pleasure of original promulgation of sound precepts of doctrine and practice by oneself, is that of bearing corroborative testimony to emanations of this nature from another person.

The editor has not found it necessary, in the discharge of his functions, to deviate from the course of enlightened eclecticism pursued by Dr. Stokes. Diagnosis, a too much neglected part of American medicine, is opened out by this gentleman with a fulness and accuracy of specification, which the guidance of pathological anatomy alone could give: and attention, by this means, being directed to the suffering organ, the therapeutical indications, though not necessarily inferred, are placed in more obvious relief than they could possibly be, if we were left to peer through the mist of conjectural symptomatology. The primary condition for solving successfully the problem of disease by its cure, is, of necessity, a clear perception of its material seat; the whereabouts and the what, identification and detection, must ever precede removal. One, and not the least of the merits of the Dublin school of medicine, so ably represented on this occasion by Dr. Stokes, is in its large and judicious borrowing from the French discoveries in morbid anatomy, and in combining the deductions which they supply with Hippocratic observation of symptoms and the externals of disease, so as to form a harmonious body of doctrine of general pathology and diagnosis. It is not, however, pretended that the therapeutical treatment will follow as an obvious deduction from these pathological premises; but very surely will pathology serve to teach a wise caution in the selection of remedies, a proper appreciation of their real effects on the tissues and organs of the body, and a prudent forbearance from their employment when the diseased organ can neither be reached, nor its morbid alterations corrected by any of the aids of art. In the manner of treating certain organic affections of, severally, the brain, lungs and heart, we see cogent examples of the advantages which a correct diagnosis gives to the instructed physician over the superficial symptomatologist. But it is not necessary to dilate hypothetically on themes which are so ably discussed and practically illustrated by Dr. Stokes

in the present volume. Of the success with which he has performed his task, Dr. Dunglison, who has the merit of being the first to collect the "Lectures," from the different numbers of a London Medical Journal through which they were dispersed, for publication in his American Medical Library, very appropriately remarks:—"He is not aware of any work in which the topics treated of are displayed in a more attractive, and at the same time a more instructive, manner."

The notes of the editor interspersed through the first and chief portion of the present volume, and designated by his initials, and his subsequent more formal additions, have been written in the same spirit with that of the original lectures; viz., an avoidance of speculative ætiology, emphasis on diagnosis deduced from morbid anatomy, and a recommendation of therapeutics, simple yet energetic, so far as they are indicated by the phenomena of the disease, and the repeated enforcements of experience. The chief subjects of the notes are *Ileitis* in connection with Typhoid fever, *Sporadic Dysentery*, *Bilious Colic*, *Inflammation of the Cæcum*—the two last not described by Dr. Stokes; *Hepatic Abscess*; *Encephalitis* illustrating phrenology; *Softening of the Brain*; *Apoplexy* as dependent on hypertrophy of the heart; *Paraplegia*; *Neuralgia*; *Scrofula*, and *Intermittent Fever*. The additional lectures, twelve in number, by the editor, are on *Typhous*, *Congestive*, and the *Eruptive Fevers*; *Rheumatism*, acute and chronic, and *Chronic Laryngitis*. His intention originally was to embody *all* his additions in the form of lectures, to come after those of Dr. Stokes, on diseases not treated of by this gentleman; and, accordingly, he had made considerable progress in a carefully prepared digest of the pathology and treatment of the diseases of the Respiratory System, beginning with simple erythematic laryngitis, and ending with tubercular phthisis pulmonalis. Of all the matter originally written for this purpose, the change in his arrangements has allowed him to bring out at this time only his lectures on Rheumatism and Chronic Laryngitis.

The substitution of his lectures on Congestive Fever for those on other diseases written by the editor, will, it is believed, be acceptable to his younger professional brethren, particularly to those residing in the Southern and Western sections of the Union. Even the fulness of description and occasional iteration of important points in pathology and therapeutics, as well as the remarks on collateral topics, especially the spurious hepatic pathology and the mercurial practice, will, he hopes, find favour in consideration of their aim and tendency, although they may not have been discussed with entire success. It will not be thought presumptuous in him to have endeavoured to open the whole field of observation and inquiry on congestive fever, to correct serious misapprehensions of its character, and to prepare a way for its better treatment, by dwelling on once familiar but, of late, forgotten truths.

In conclusion, he believes that the present work, which is not offered as a substitute fitted to supplant them in public estimation, will be received as a positively valuable *addition* to existing medical summaries and Systems of Practice.

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University of Pennsylvania.

MEDICAL DEPARTMENT.

The Course of Lectures will commence on Monday the 2d day of November, and be continued under the following arrangement:—

Nathaniel Chapman, M.D., Practice and Theory of Medicine.
Robert Hare, M.D., Chemistry.
William Gibson, M.D., Surgery.
William E. Horner, M.D., Anatomy.
Samuel Jackson, M.D., Institutes of Medicine.
George B. Wood, M.D., Materia Medica and Pharmacy.
Hugh L. Hodge, M.D., Obstetrics and the Diseases of Women and Children.

Clinical Lectures on Medicine and Surgery are delivered regularly at the Philadelphia, Hospital, (Blockley,) and at the Pennsylvania Hospital, from the beginning to the end of the session.

W. E. HORNER, *Dean of the Medical Faculty*,
263 Chesnut Street.

Philadelphia, July 15, 1840.—Nov. 15.

Jefferson Medical College of Philadelphia.

SESSION OF 1840-41.

The regular Lectures will commence on the first Monday of November.

The following are the professors in the order of their appointment:—

1. Jacob Green, M. D., Chemistry.
2. Granville S. Pattison, M.D., Anatomy.
3. John Revere, M.D., Practice of Medicine.
4. Robley Dunglison, M.D., Institutes of Medicine and Materia Medica.
5. Robert M. Huston, M.D., Obstetrics and Diseases of Women and Children.
6. Joseph Pancoast, M.D., Surgery.

On and after the 1st of October the dissecting rooms will be kept open, and the Professor of Anatomy will give his personal attendance thereto. Lectures will likewise be delivered regularly during the month on various branches, and opportunities for clinical instruction will be afforded at the Philadelphia Hospital under the Professors of Institutes of Medicine and Surgery; and at the Dispensary of the College under the Professors of Physic and Surgery.

JOHN REVERE, M.D., *Dean of the Faculty*.

Philadelphia, July 15, 1840.—Nov. 15.

Washington University of Baltimore.

SESSION 1839—40.

The regular lectures in this institution will commence on the *last Monday of October*, and continue to the first of March. The Faculty consists of the following professors, in the order of their appointment:

J. H. Miller, M.D., Professor of Anatomy and Physiology.
Samuel K. Jennings, M.D., Professor of Materia Medica, Therapeutics, and Legal Medicine.
Wm. W. Handy, M.D., Professor of Obstetrics and Diseases of Women and Children.
John C. S. Monkur, M.D., Professor of Institutes and Practice of Medicine.
Edward Foreman, M.D., Professor of Chemistry.
John R. W. Dunbar, M.D., Professor of Surgery and Surgical Anatomy.
W. R. Handy, M.D., Demonstrator of Anatomy.

The plan of this institution is a new one in this country; the college buildings are so constructed as to present peculiar advantages to the student, which every intelligent medical man will at once perceive, as this plan unites a Medical College, Marine and City Hospital, and rooms and excellent board for a large number of resident students who have the charge of the patients under the direction of the professors. Clinical lectures are delivered during the session on Medicine and Surgery, by the professors of the respective chairs. Additional information in reference to the plan, terms, &c. and a circular may be obtained by a letter addressed to

JOHN R. W. DUNBAR,
Dean of the Faculty of Medicine.

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With Numerous Notes and Twelve Additional Lectures

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Lecturer on the Institutes of Medicine and Medical Jurisprudence, Fellow of the College of Physicians of Philadelphia, and Member of the American Philosophical Society, etc.

HASWELL, BARRINGTON, AND HASWELL,
293 *Market Street, Philadelphia.*

Transylvania University.

MEDICAL DEPARTMENT.

THE Lectures will commence, as usual, on the first Monday in November, and close on the last day of February, and be delivered by the following faculty, viz:—

BENJ. W. DUDLEY, M.D., Professor of Anatomy and Surgery.

JAMES M. BUSH, M.D., Adjunct Professor of Anatomy and Surgery.

JAMES C. CROSS, M.D., Professor of Institutes and Medical Jurisprudence.

NATHAN R. SMITH, M.D., Professor of Theory and Practice of Medicine.

WILLIAM H. RICHARDSON, M.D., Professor of Obstetrics and Diseases of Women and Children.

THOMAS D. MITCHELL, M.D., Professor of Materia Medica and Therapeutics.

ROBERT PETER, M.D., Professor of Chemistry and Pharmacy.

The cost of a full course of Lectures is One Hundred and Five Dollars. The Matriculation fee, entitling to the use of the Library, is Five Dollars. The Dissecting ticket, (which is optional with the pupil,) is Ten Dollars. The Graduation fee is Twenty Dollars.

☞ Good boarding and lodging, including fuel and light, can be had from $2 50 to $4 per week.

Large additions have been made, during the past and present year, to the Library, Apparatus and Museum; and the new and commodious MEDICAL HALL will be ready for the use of the Department.

Notes of good and solvent banks, in the States whence the pupils respectively come, will be taken for Professor's tickets.

ROBERT PETER, *Dean of Faculty.*

Lexington, Ky., *June* 27, 1840.

LECTURES ON HERNIA AND MECHANICAL SURGERY.

On Tuesday evening the 9th of November, at 7 o'clock, Dr. CHASE will commence his Winter Course of Lectures on Hernia and analogous diseases, combined with Mechanical Surgery, as applied to the *correction of distortions.*

The relief of the various *curvatures of the spine, deformities of the limbs,* and *club-foot,* will be discussed.

The Lectures will be delivered in the Lecture Room at his private residence, on Tuesday and Friday of each week, at 7 o'clock, P.M., and will continue three months.

This arrangement, it is believed, will not interfere with any of the established Lectures in the city.

The course will be purely *clinical,* as in every instance patients will be present affected with the disease or deformity under consideration, and the Student will have an opportunity of becoming practically acquainted with the use all of the instruments employed in the treatment of these diseases.

Ticket FIVE DOLLARS.

HEBER CHASE, M.D.
Ninth Street, below Walnut.

Philadelphia, Sept. 1840.